JANUARY 12, 1959

PAPER TRADE JOURNAL

How a Small English Mill Employs Modern Techniques and Equipment

Swedish Mill Uses Wet Strength Tests on Pulp as Routine Control Procedure

Theory and Practice Related in Causticizing of Green Liquor

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PUNCTUALITY

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only one small aspect of expert Gottesman
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Chemical cleaning service for all industry

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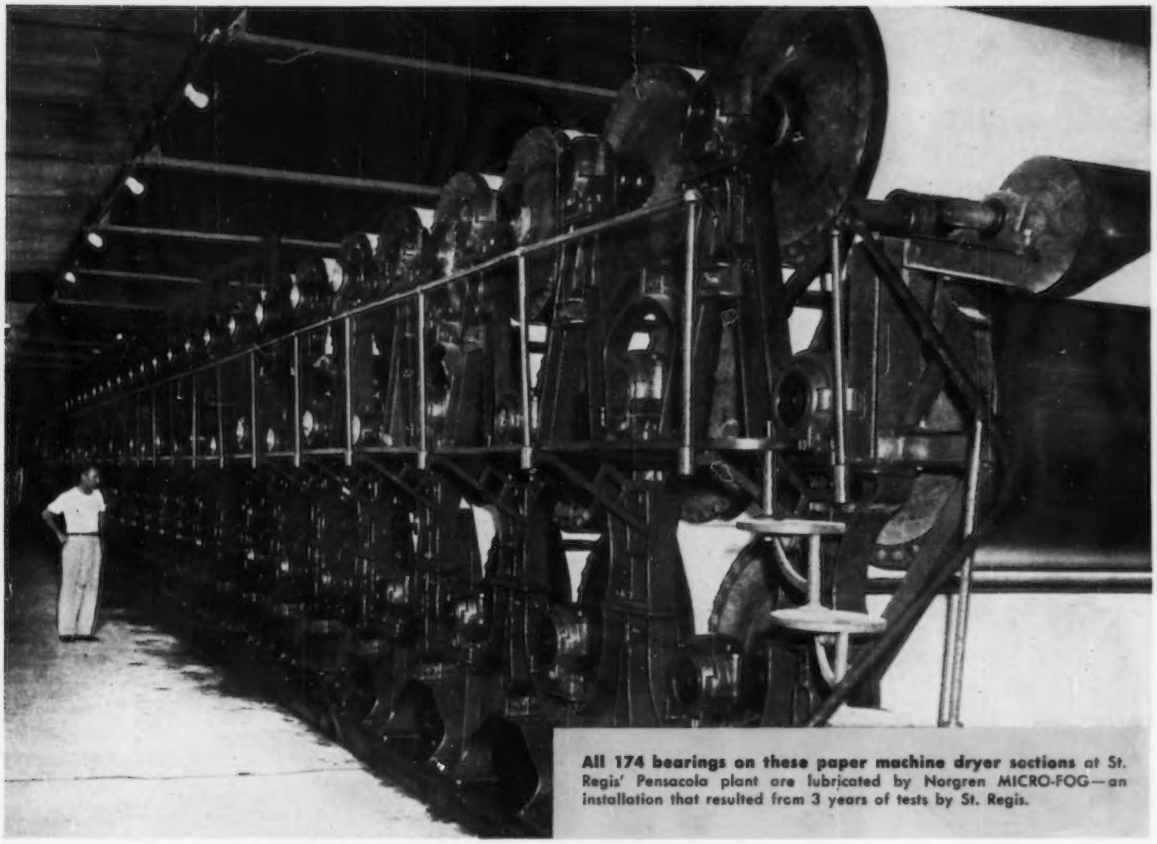

All 174 bearings on these paper machine dryer sections at St. Regis' Pensacola plant are lubricated by Norgren MICRO-FOG—an installation that resulted from 3 years of tests by St. Regis.

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Results of three years of testing by St. Regis prove Norgren MICRO-FOG Lubrication on paper machine dryer sections best in every way...

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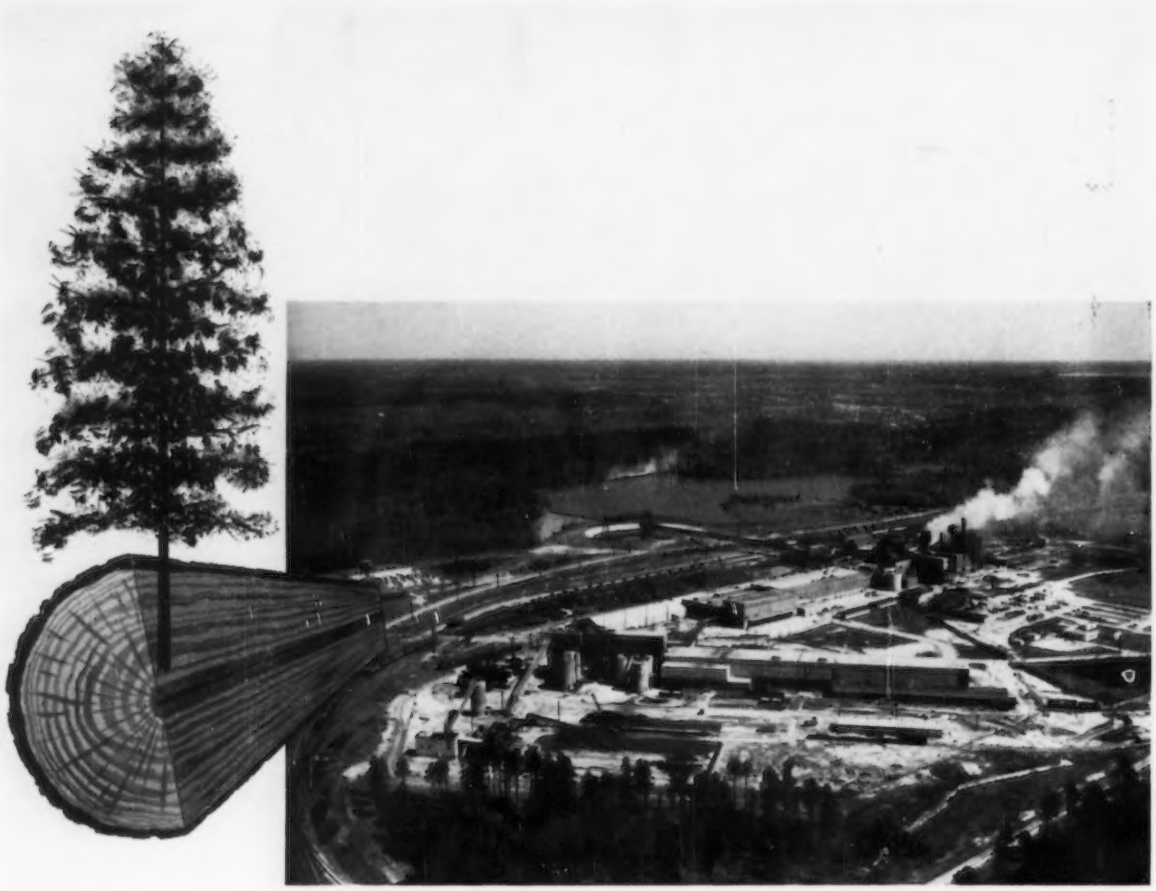

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Where Trees are Processed into Paper

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REMEMBER THESE DATES

Jan. 28-30, 1959: Canadian Pulp and Paper Assn. Annual Meeting, Queen Elizabeth Hotel, Montreal

Feb. 23-26, 1959: Paper Week in New York

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on No. 1 Paper Machine

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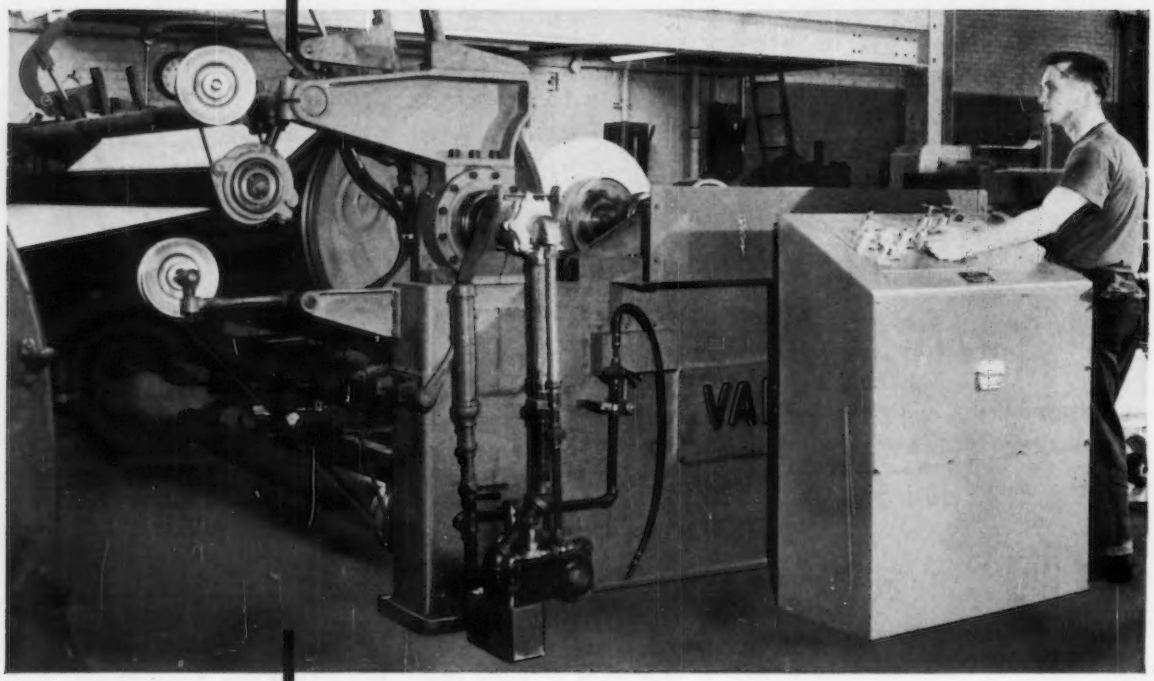

Horizontal Track Surface Wind Reel designed for later addition of center wind components.

A major departure in reel design to provide completely versatile operation, surface or center wind, or a combination of both, with zero loading of the spool to the drum. Spool weight supported completely by the ways with no weight component on the drum.

Reel designs include spool starters, rope systems, spool brakes, stationary or oscillating doctors, as well as automatic operating features.

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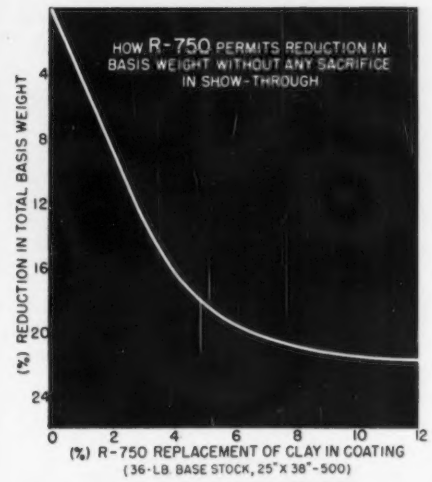
HORSE HEAD®
R-750
(RUTILE)
TITANIUM DIOXIDE



IS SHOW-THROUGH YOUR PROBLEM in developing lighter-weight magazine papers? You can lower your basis weight and yet maintain equal resistance to show-through by replacing part of the coating clay with HORSE HEAD R-750.

Here's the reason why:

HORSE HEAD R-750, a bright white pigment, possesses optimum particle size and highest refractive index. These factors work together to provide maximum resistance to show-through.

This chart, based on results obtained by our Paper Research Laboratory, shows how replacement of small percentages of clay with HORSE HEAD R-750 in coating colors permits substantial reduction in basis weight without any sacrifice in resistance to show-through.

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Multiwall Converters PREFER RAWE BOTTOMERS

For
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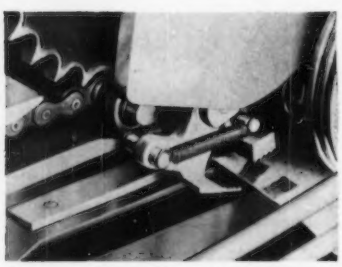
SIMPLICITY!
QUICK CHANGEOVER!
SMOOTH OPERATION!

Suction and opening device.

The many installations in this country are proving the superior merits of the Rawe Bottomer for both flush-cut and stepped-end multiwall tubes.

The Rawe Bottomer will bottom one to six-ply tubes with valve inserts or open mouth. Multiwall sacks, made on the Rawe Bottomer are used for cement, lime, plaster, fertilizer, chemicals, etc., from such varied materials as kraft, light crepe, asphalt, foil lined, etc.



Gripper just before taking over the paper tube.

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- Semi-automatic feeder table
- Re-circulating adhesive
- Central lubrication
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Union Bag & Paper Corp.
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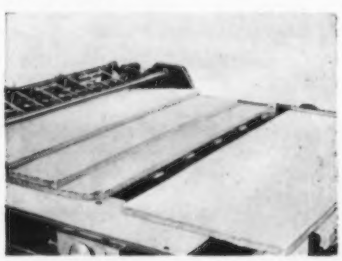
Several of above have two or more RAWE Bottomers.



Feeder table fed with tube piles.

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Requires No Additional Equipment

"BLEACH IT WHILE YOU MAKE IT!"

Buffalo, N. Y., December, 1958–The Becco Chemical Division, Food Machinery and Chemical Corporation, announced today a new technique for cold caustic pulp bleaching that requires *no* additional bleaching equipment. Bleaching takes place in the same equipment regularly used for the manufacture of cold caustic pulp.

In the new process, peroxide bleach liquor is added at the Bauer refiner, and bleaching occurs during the refining operation. Bleach response is dependent on refiner densities.

Up to 20 points brightness increase has been obtained in commercial operations to date. No additional steam costs are incurred, and the process requires no holding time. Chemical costs are not excessive, considering that the new process permits use of greater amounts of low-cost and more plentiful pulp, without capital investment for bleach equipment.

The process can be applied to all typical cold caustic pulps, and Becco is prepared to assist you immediately in setting up a production run and evaluating results. If you would like to have a Becco Technical Representative call, with no obligation on your part, write us at: Dept. PTJ-37.

*Patent Pending

Progress in Peroxygens

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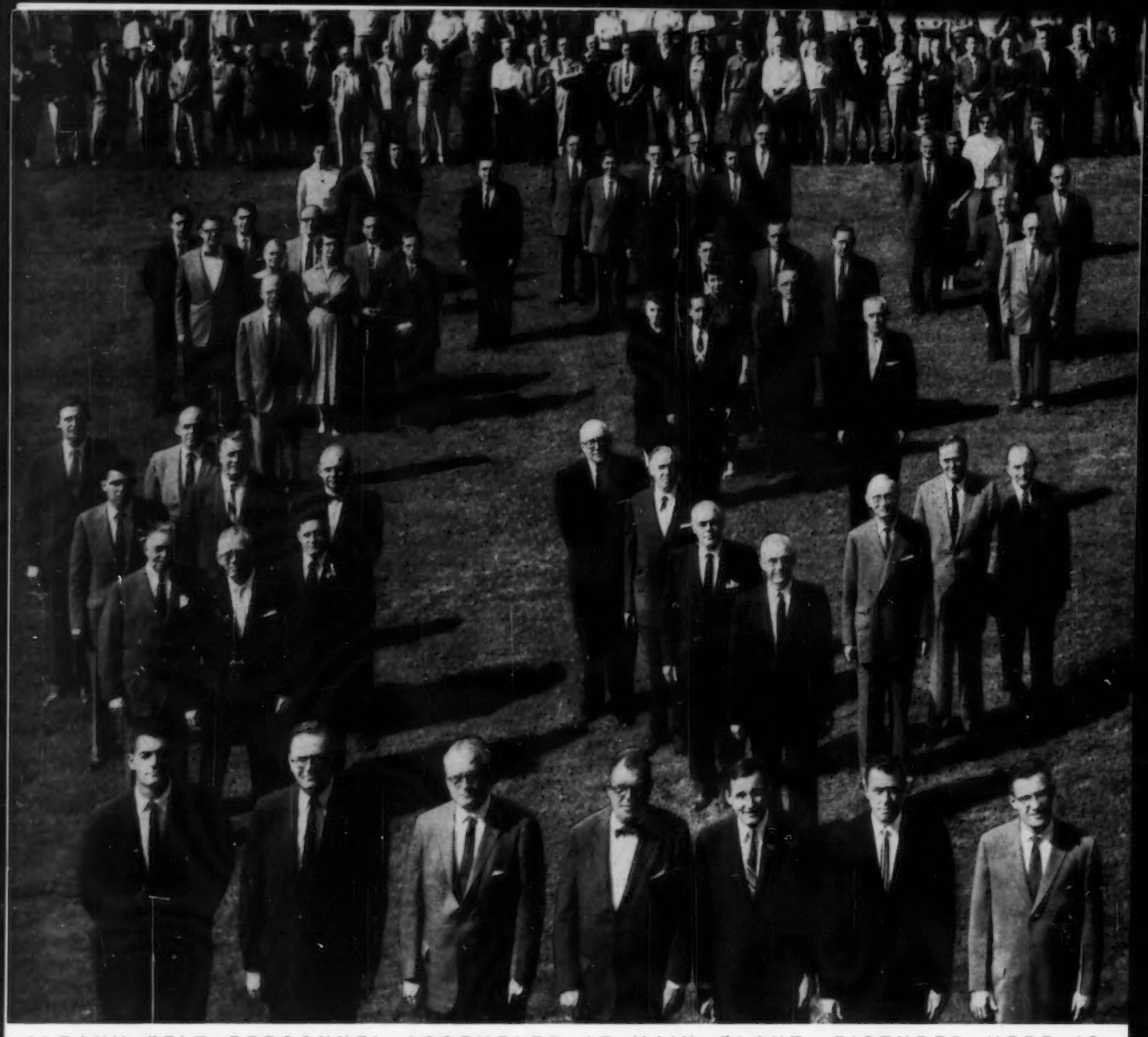

ALBANY FELT PERSONNEL ASSEMBLED AT MAIN PLANT. PICTURED HERE IS

WHAT'S BEHIND THE ALBANY SALES ENGINEER...

Backing up the Albany Sales Engineer who regularly calls at your mill is an outstanding team — available to serve your needs at any time. Each Sales Engineer can call into action all or part of this army of highly trained specialists to help solve your felt problems, and you can be sure everyone at Albany from the top down has the papermaker's interest at heart.

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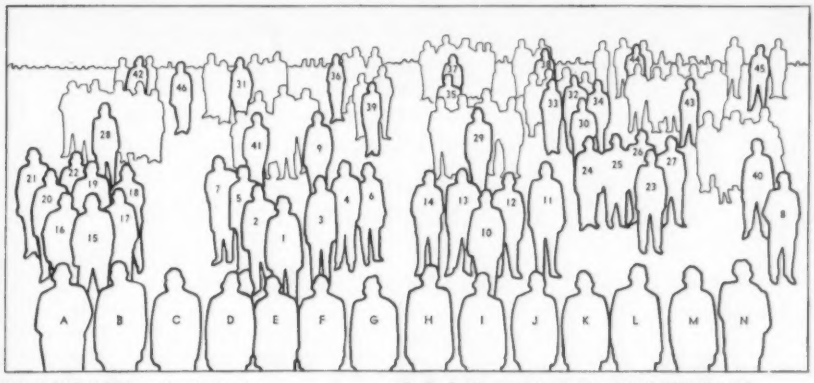

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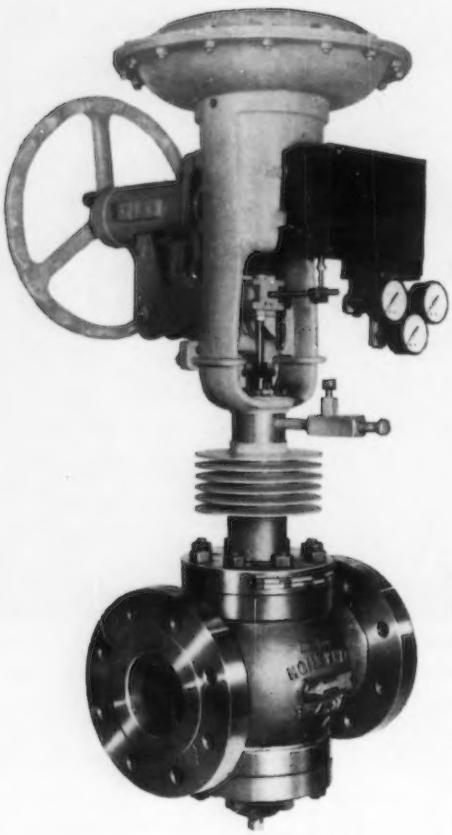
is your PROCESS FLOW HOT?



Honeywell control valves are available for a wide range of temperatures

Whether you're talking about 1200 or minus 450° F, there's a Honeywell automatic control valve for your process flow. The Honeywell valve illustrated—Series 800, Type 11 double seated—is designed to handle fluids at 1200° F. This application requires such features as: welded-in, solid stellite guide bushings . . . stellited guide posts . . . seal-welded seat rings . . . spiral wound, asbestos-filled, stainless steel gaskets . . . high-temperature bolting . . . extended bonnet with fins . . . designed clearances for non-sticking, non-galling operation.

For hot or cold flows . . . or other process flow conditions . . . Honeywell valves are available in a wide range of types and sizes. When you need control valves . . . contact your local Honeywell field engineer. Write for new Catalog C800-1.

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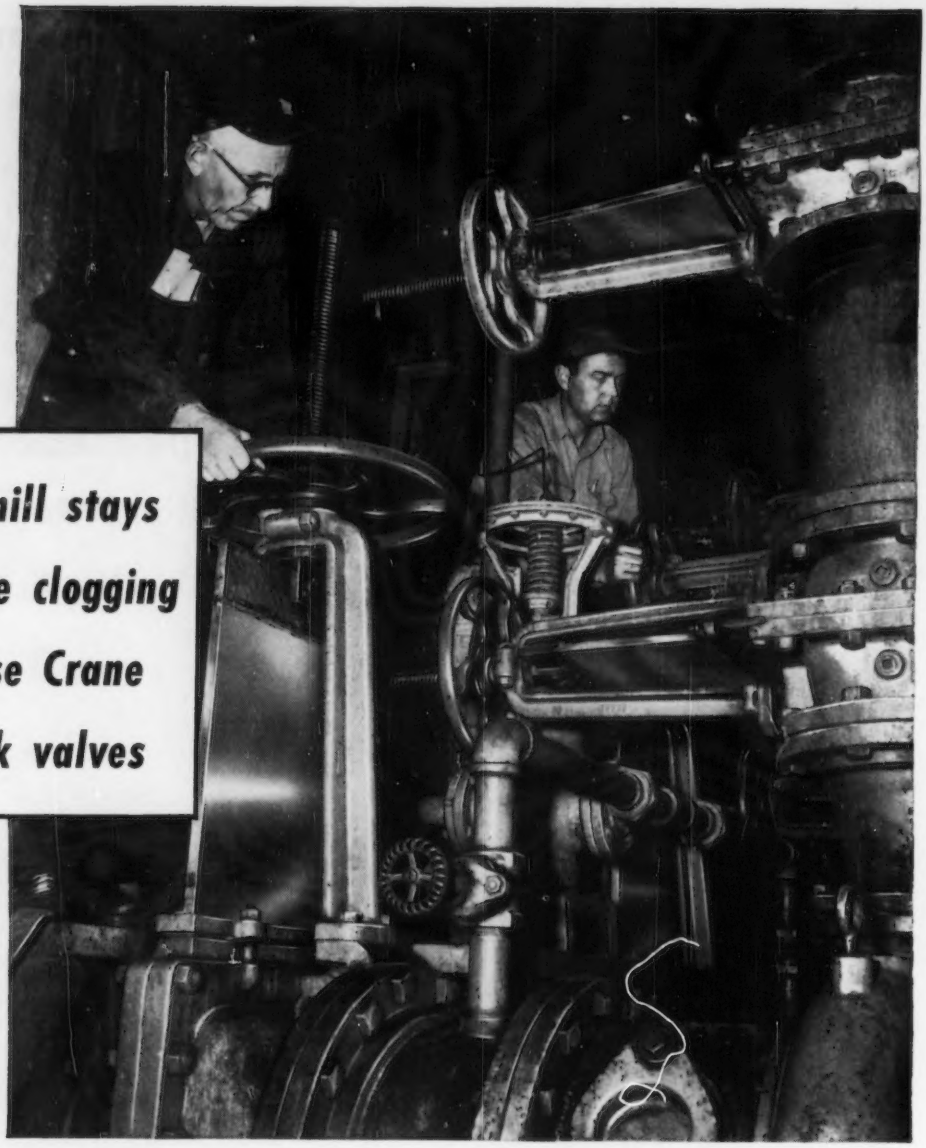

Another mill stays free of line clogging with these Crane pulp stock valves

This scene is in a leading Southern kraft mill. The valves—10- and 18-inch Crane pulp stock valves—are on lines from brown chest to screens.

These valves were installed 15 years ago and have been operated approximately once a week since then. More important, they demonstrated to the mill management that clogging of stock lines due to valve leakage and entrapment of fibers can be avoided completely.

So well have these Crane valves performed that the mill standardized on them several years ago. As a result, it has since had no problems with valve leakage or stock line clogging.

The unmatched efficiency of Crane pulp stock valves is in their highly developed "combing" and shearing-action seating design. There's no jamming of fibers under the disc; the Crane knife-edge cuts through them to seat tightly. Crane no-bonnet design leaves no place for pulp impaction in the valve body.

Ask for Circular AD-2156

This circular will show you quickly why Crane valves work where others fail. It also gives specifications on the full Crane line, including the all-new stainless steel, short face-to-face pattern. Ask your Crane Representative for a copy or write to address below.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill.—Branches and Wholesalers Serving All Areas

THIS IS DRYDEN PAPER COMPANY

Customer's one-word report on this pulp: "WONDERFUL!"

Back in the Spring of 1956, one of America's leading paper makers began to look for ways to improve their products. They realized that, to get a better product, they had to start with a better pulp.

The engineers and lab men at this plant heard reports about a new pulp coming down from Canada—the two-stage chlorine dioxide Northern bleached sulphate pulp that Dryden Paper Company would soon be producing at its new Dryden, Ontario, plant. So these paper men ordered a fifty-pound sample of Dryden, unbleached, so that they could bleach it and follow it through into paper in their own labs.

Their one-word report: "Wonderful!"

Soon after the opening of the Dryden plant in 1957, they contracted for several thousand tons of Dryden pulp for each of the next five years...but they soon came to rely on Dryden as their *only* source for quality pulp, continually upping their shipping orders. 1958 shipments are nearly three times the original tonnage.

Compare Dryden Bleached Sulphate with the best quality pulp you know. You, too, will say it deserves all the laboratory endorsements—*and all the production testimonials*—it now enjoys. Order a trial shipment today.

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DRYDEN, ONTARIO, CANADA

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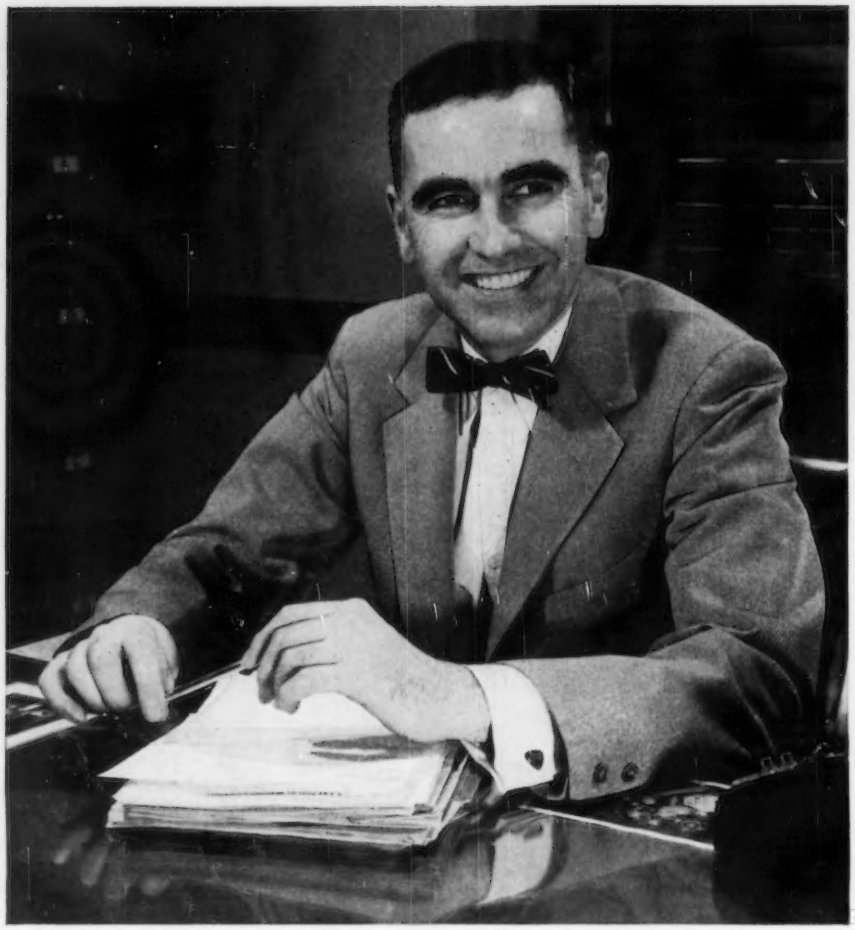

"In the manufacture of fine papers," Finch, Pruyn's Harry E. Earl says . . .

"We select suppliers whose standard of quality is as high as ours"

"We are a closely integrated organization," states Harry E. Earl, director of purchasing and traffic for Finch, Pruyn & Company, Inc., Glens Falls, New York.

"Our aim is to produce, within practical limits, everything that goes into our printing papers, converting papers for business forms and tablets, and related products.

"For those items which we are unable to produce because of their specialized nature, we must purchase to the same high specifications that we use in our own manufacturing.

"Consequently, we select suppliers who strive to meet these rigid standards . . . suppliers like Wyandotte, whose goal of high quality is the same as ours.

"I have visited Wyandotte, and know that this is true. It is further evidenced by the thoroughness of Wyandotte technical-service representatives when they have worked with us in our plants."

How about you? If this sounds like the kind of progressive chemical company you'd like to do business with, and your product need or problem falls within our technological background, why not note this address now: *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

Wyandotte

CHEMICALS

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Pacing Progress with Creative Chemistry

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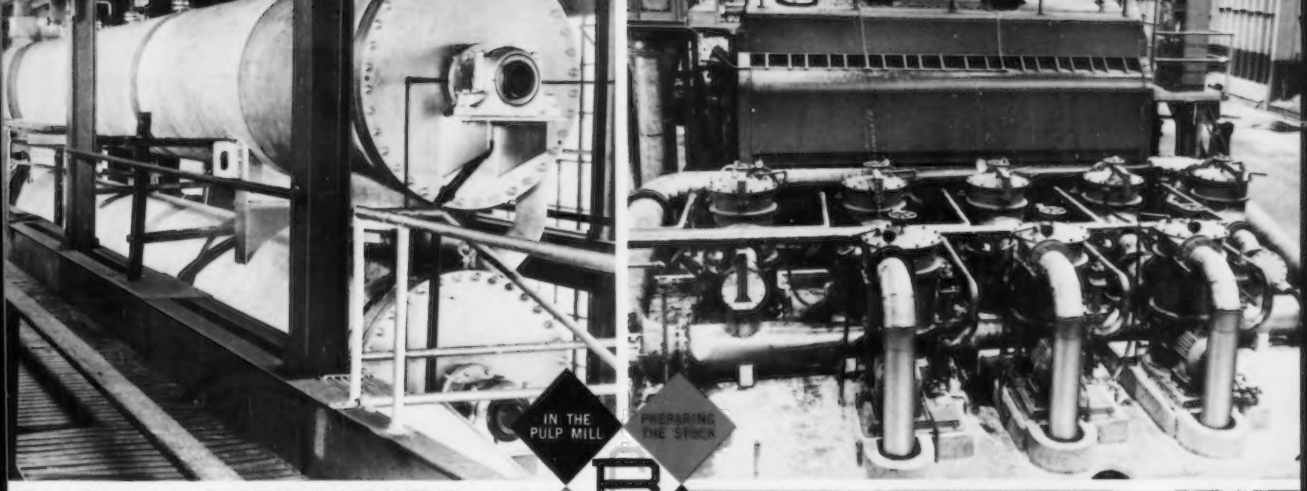

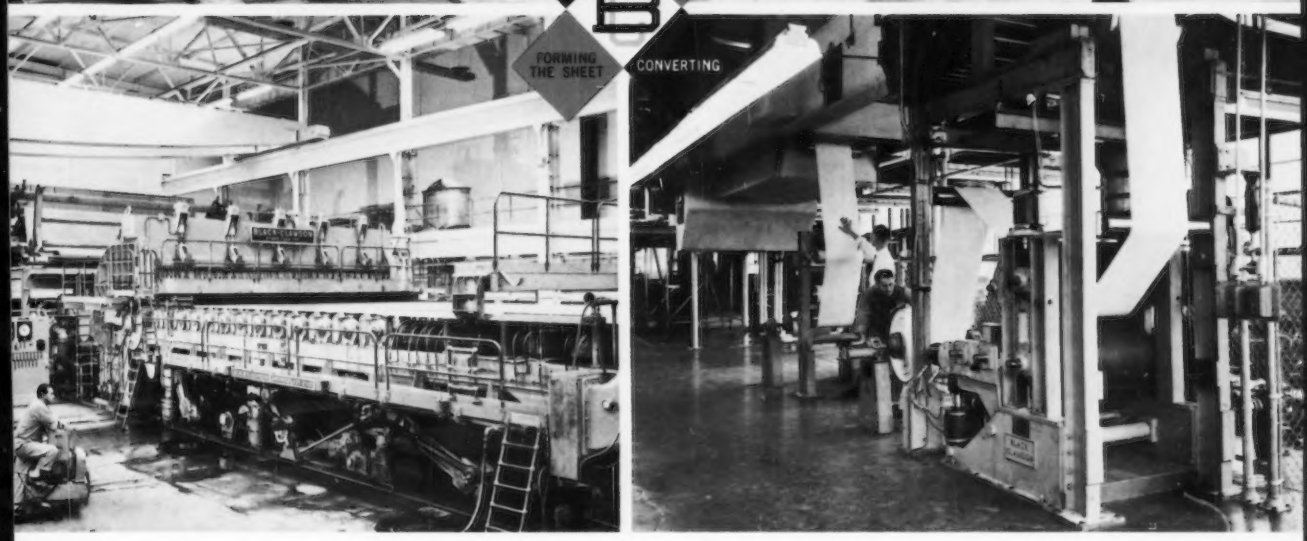

In Every Paper-Making Process . . . BLACK-CLAWSON *is There*

. . . a single source of *coordineered* equipment

You can depend on Black-Clawson, the one single source machinery supplier to the paper industry, to provide a component, a machine or a complete system of integrated equipment that will improve production at any point in your pulp or paper mill.

With four specialized engineering and manufacturing divisions welded into one integrated service organization, Black-Clawson has the "coordineered" equipment and universal experience to help you solve any problem in the pulp mill, stock preparation system, on the paper machine, in the finishing room or converting plant.

You'll discover that single source buying is economical in many ways.

In the Pulp Mill . . . Chemi-Pulper®, continuous digester
Preparing the Stock . . . Selectifier® Screens ahead of high-speed Fourdrinier
Forming the Sheet . . . World's largest paper machine . . . 342" wire width
Converting . . . Pilot Plant Coating Line

PANDIA DIVISION — PULP MILL EQUIPMENT
SHARTLE DIVISION — STOCK PREPARATION EQUIPMENT
PAPER MACHINE DIVISION — PAPER & BOARD MACHINES
DILTS DIVISION — CONVERTING MACHINERY

THE BLACK-CLAWSON COMPANY

Executive Offices: 250 Park Ave., New York, N. Y.
Plants: Middletown, Ohio, Hamilton, Ohio, Watertown, N.Y., Fulton, N.Y.
Black-Clawson (Canada) Ltd., Montreal, P.Q.
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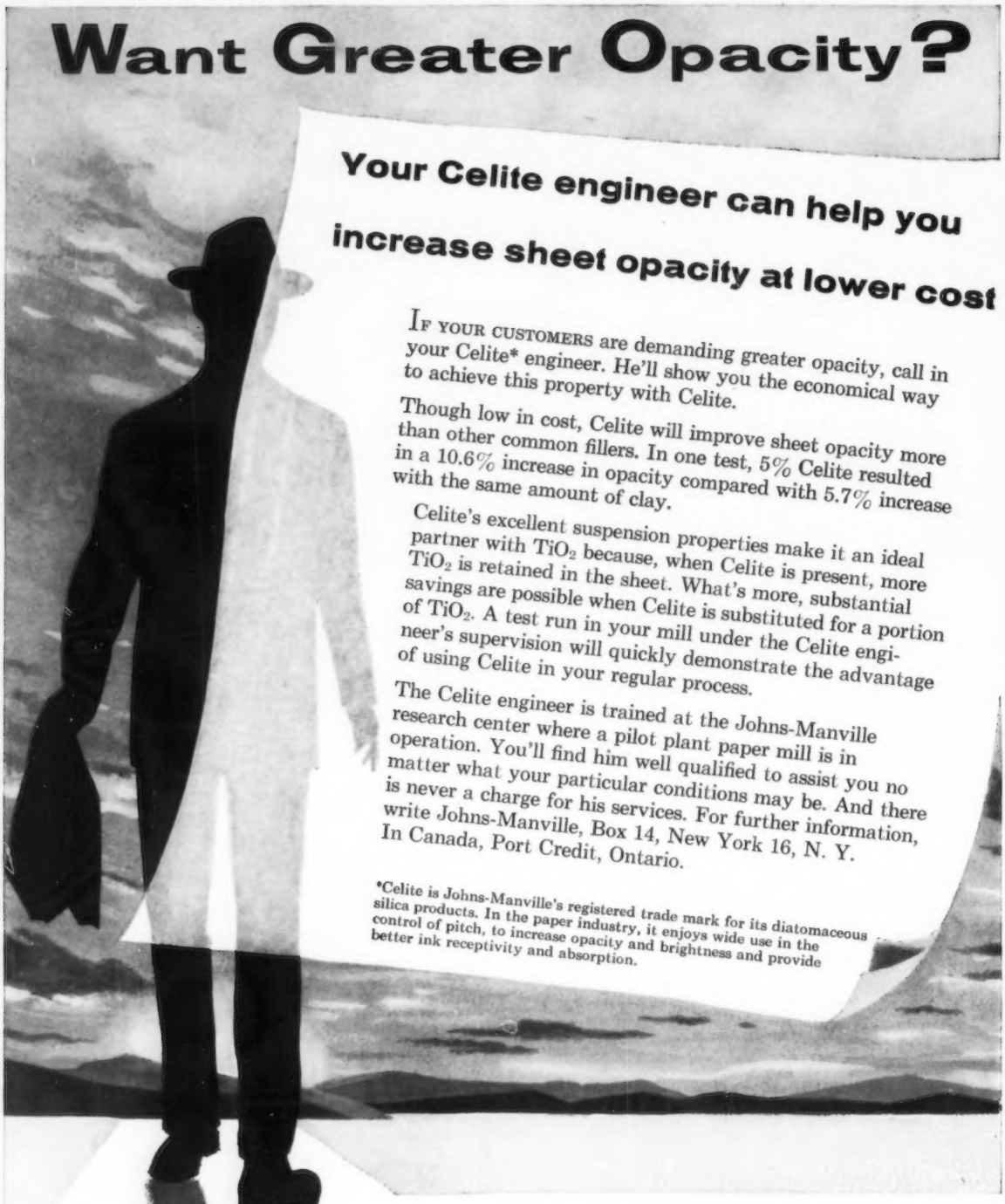
Want Greater Opacity?



Your Celite engineer can help you increase sheet opacity at lower cost

IF YOUR CUSTOMERS are demanding greater opacity, call in your Celite* engineer. He'll show you the economical way to achieve this property with Celite.

Though low in cost, Celite will improve sheet opacity more than other common fillers. In one test, 5% Celite resulted in a 10.6% increase in opacity compared with 5.7% increase with the same amount of clay.

Celite's excellent suspension properties make it an ideal partner with TiO_2 because, when Celite is present, more TiO_2 is retained in the sheet. What's more, substantial savings are possible when Celite is substituted for a portion of TiO_2. A test run in your mill under the Celite engineer's supervision will quickly demonstrate the advantage of using Celite in your regular process.

The Celite engineer is trained at the Johns-Manville research center where a pilot plant paper mill is in operation. You'll find him well qualified to assist you no matter what your particular conditions may be. And there is never a charge for his services. For further information, write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products. In the paper industry, it enjoys wide use in the control of pitch, to increase opacity and brightness and provide better ink receptivity and absorption.

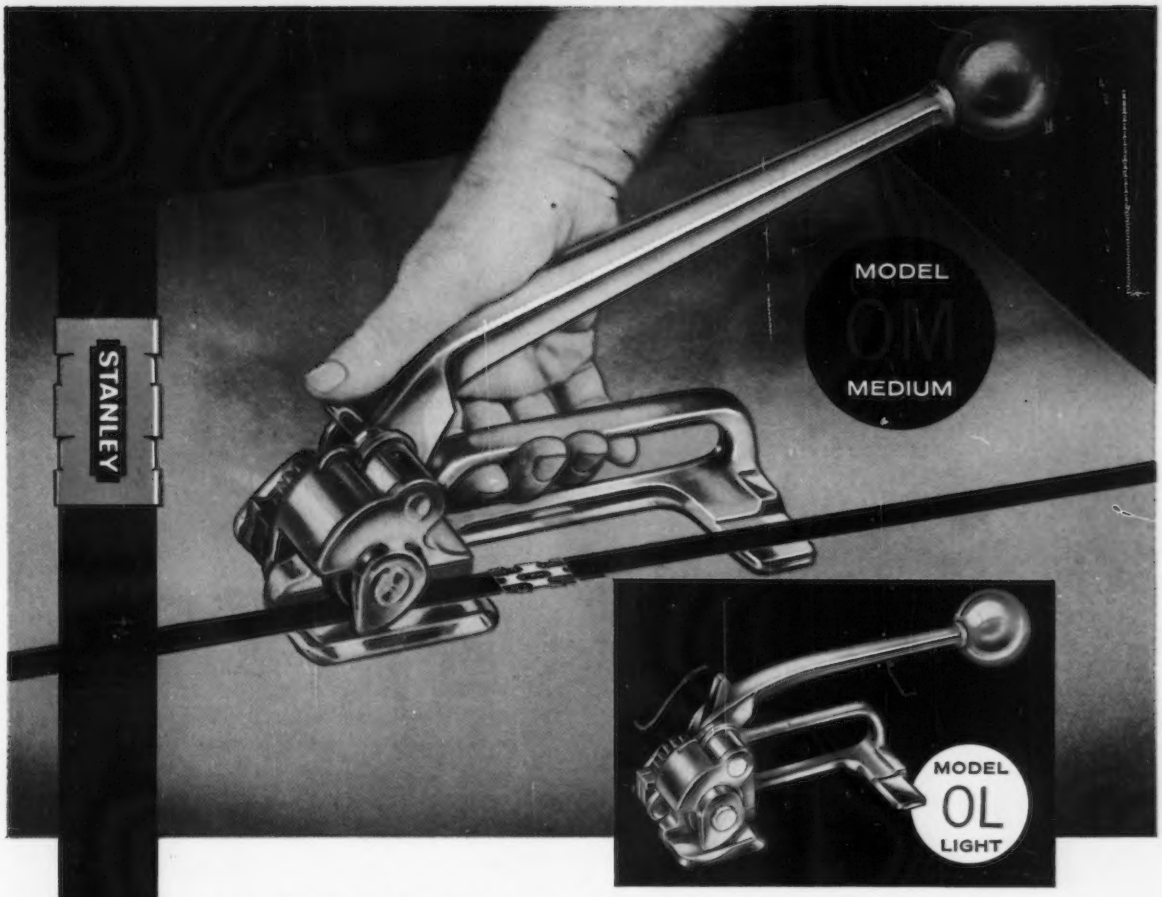
CELITE PROPERTIES CONTRIBUTING TO OPACITY

Refractive Index	1.40—1.49
Porosity	65% to 85%
Surface Area	214 sq. ft. gm.
Average Particle Size Range	4 to 10 (microns)

JOHNS MANVILLE JM PRODUCTS

Johns-Manville CELITE

PRODUCTS FOR THE PAPER INDUSTRY



NEW STANLEY TIGHTENERS

Versatile...Lightweight...Sturdy–

The Stanley O Tightener sets a new standard of efficiency for tensioning steel strapping to the required maximum with a manually-operated steel strapping tool with unlimited take-up.

The O Tightener is versatile . . . used to steel strap packages of varying sizes, shapes and weights. Operates with equal ease and speed in any position. Easy to handle, and requiring fewer strokes for take-up, it reduces operator fatigue and saves time. It's a strap-saver too! Applying seals behind tensioning wheel cuts overlap to minimum required for maximum joint security. Tightening action is more positive because there are *two* holding pawls on tensioning wheel. Removal from strapping is instantaneous. The operator returns tightening lever to down position and slides tool from strapping.

FEATURES

- **Insertion, alignment of strapping is easy, quick.**
- **Light weight and balance assure handling ease.**
- **Sturdy construction means long life.**
- **Has unlimited take-up.**
- **Seals may be applied in front of or behind tensioning wheel.**

MODEL OL	3	3/8" STRAP
	4	1/2"
	5	5/8"
MODEL OM	5	5/8" STRAP
	6	3/4"

For more information, write STANLEY STEEL STRAPPING, Division of The Stanley Works, Dept. A, 1307 Corbin Ave., New Britain, Conn.

STANLEY **INSURE IT - SECURE IT WITH STANLEY STEEL STRAPPING**

AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

STANLEY

This famous trademark distinguishes over 20,000 quality products of The Stanley Works—hand and electric tools • drapery, industrial and builders hardware • door controls • aluminum windows • stampings • springs • coatings • strip steel • steel strapping—made in 24 plants in the United States, Canada, England and Germany.

Although he may not know it

The combination of Bauer Double Revolving Disc Refiners and Centri-Cleaners make reading more enjoyable by producing more uniform, cleaner paper. The refiners provide excellent dispersal and retain maximum fiber length for best sheet formation; Centri-Cleaners provide the cleanest paper possible. Mills producing quality papers for printing from deink stock, such as Rex Paper Co., Kalamazoo, Michigan, find they gain extra sales advantages through this team. Send for details today.

Bauer

THE BAUER BROS. CO.

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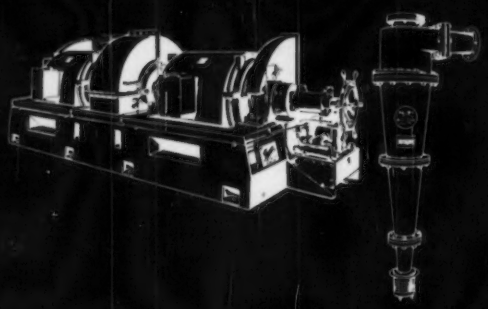


Trends

Surveying Major Industry Outlook

Big improvements in automobile, steel and construction industries in 1959 are forecast in the U.S. Dept. of Commerce "Annual Survey of Outlook for Major Industries." Some industry-by-industry predictions are as follows: AUTOMOBILES —Industry estimates look to production of 5½ million cars, up 30% from 4¼ million in 1958. CONSTRUCTION—Biggest single industry in the economy expects to pass $50 billion mark in 1959 with a 7% increase over last year. ELECTRICAL EQUIPMENT—General strengthening of electrical equipment market promises a 10% increase in sales. IRON AND STEEL—Improved business and inventory building should raise ingot production about 25%, provided there are no strikes in this industry. Three year labor contracts expire on July 1. CONTAINERS AND PACKAGING—All types of containers appear heading for new records. TEXTILES—General upturn but degree will vary in different segments. Foreign competition said to be a disturbing factor. NEWSPAPERS—Look for circulation figure of 50 million and expect a 10% gain in advertising revenues. COMMERCIAL PRINTING—This big business expects volume to be in excess of 6 billion, up over 7%. MAGAZINES—Expect to gain ground lost in 1958 with a 7% increase in advertising revenue equalling or surpassing 1957. BOOK PUBLISHING—A 10% increase in sales over record 1958 of 1.1 billion. PULP, PAPER & BOARD—As previously reported here, the Dept. of Commerce is predicting a conservative 4% increase over 1958 and 2% over record set in 1956.

Price Outlook for 1959

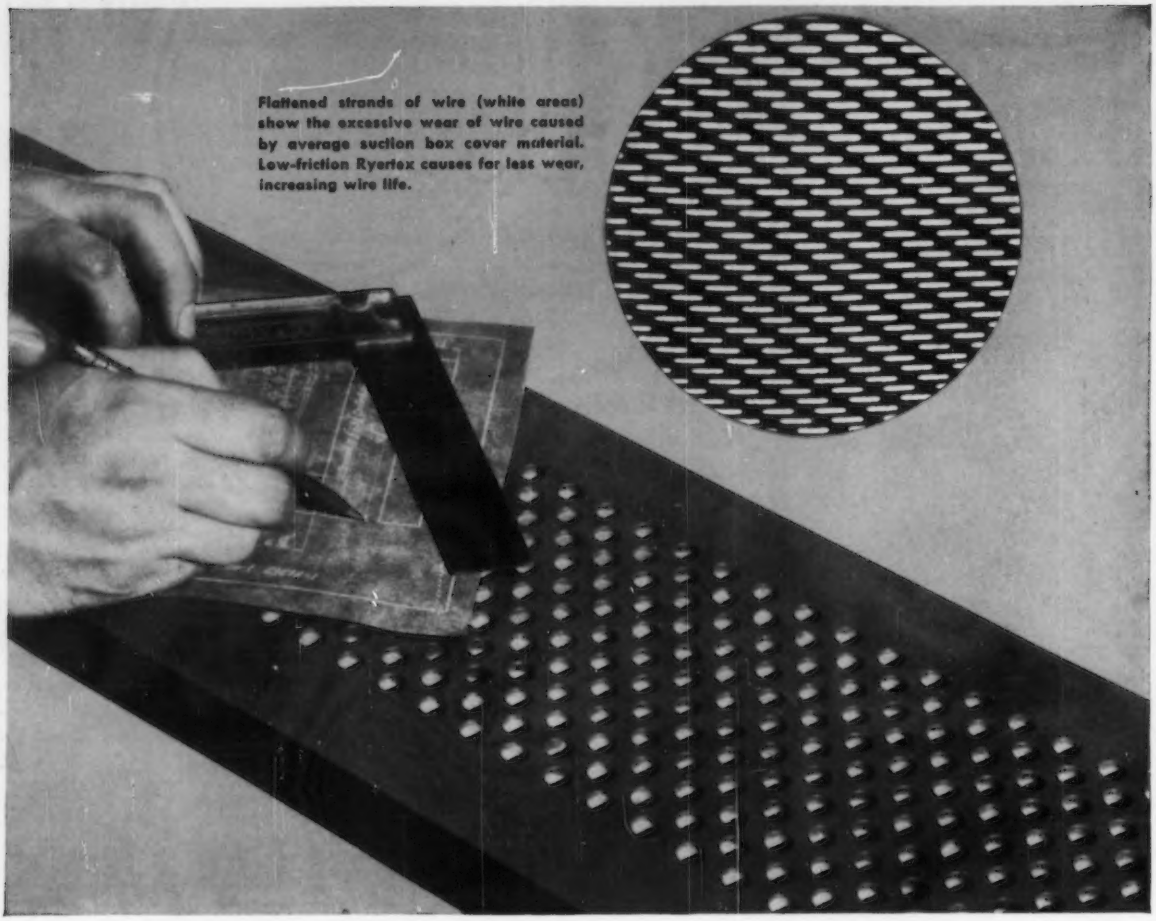
Moderate price increases are predicted for many grades of paper and board as demand increases. A small use is seen for pulp prices at the earliest possible time that market conditions permit, maybe in the latter half of the year. Waste paper prices will continue to rise as long as mill purchases increase.

Pulp Production Off 1% in 11 Months

Pulp production up to December 1958 (11 months) was off 1% compared with the same period in 1957, according to detailed statistics released this week by the U.S. Pulp Producers Ass'n. The tonnage produced by our companies for their own use, (which represents about 90% of the total), was almost exactly the same for the two periods mentioned. Shipments to the domestic market (8% of total production) were off 10% and foreign shipments (2½% of total) were off 16%. Production for the month of November was 1% ahead of the same month in the previous year. Tonnage used by the companies themselves was 3% ahead of November 1957. Domestic shipments in November were only a small fraction of 1% behind and foreign shipments for the month were off 14% compared to a year ago.

Waste Paper Market Features News Rise

Increases in price of folded news in New York and Chicago areas featured the post-holiday activity of the waste paper markets, as predicted here last week.


Flattened strands of wire (white areas) show the excessive wear of wire caused by average suction box cover material. Low-friction Ryertex causes far less wear, increasing wire life.

GET 25% MORE WIRE LIFE

Use Ryertex® suction box covers

At your wire's only point of drag—the suction box—you can reduce wire wear substantially by the use of job-proven Ryertex.

No other cover material has a lower coefficient of friction with water lubrication—less than 0.01, or about half that of wood covers under normal operating conditions. Wires slip so smoothly over Ryertex that their service life is increased as much as 25%—four wires doing the work of five. This means important wire savings.

Your covers last longer, too, because Ryertex is a phenolic, laminated-textile composition that is smooth, tough, long-lasting. When a leading paper mill tested Ryertex against two competitive materials, the Ryertex covers lasted three times as long as material A, 35 times as long as material B.

Because even the largest covers are made of one continuous piece of Ryertex, they may have any perforation pattern of holes or slots, straight or tapered, in any combination that works best for you.

Next time you replace suction box covers, forming boards or pipe covers, investigate Ryertex. Call your nearby Ryerson plant.

You will also find many marked advantages in Ryertex paper mill bearings.

INDUSTRIAL PLASTICS AND BEARINGS DIVISION

RYERSON STEEL®

Member of the INLAND Steel Family

Other Products: Ryertex-Omicron PVC pipe and fittings, sheets and rods • Babbitt metal • aluminum • carbon, alloy and stainless steel in every type, shape and size • metalworking machinery, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK · BOSTON · WALLINGFORD, CONN. · PHILADELPHIA · CHARLOTTE · CINCINNATI · CLEVELAND DETROIT · PITTSBURGH · BUFFALO · INDIANAPOLIS · CHICAGO · MILWAUKEE · ST. LOUIS · LOS ANGELES · SAN FRANCISCO · SPOKANE · SEATTLE

PAPER TRADE JOURNAL

WEEK OF JANUARY 12, 1959

First Million Tons Made at Calhoun

Bowaters Southern Paper Corp. produced its first millionth ton of newsprint December 31. This milestone was achieved on the new number four paper machine which came into operation on December 18.

The start-up of the new paper machine was outstanding. This 276-inch machine was actually put into initial operation at a speed of 2,035 feet per minute. The time consumed from stock on the wire to sheet on the reel was but 80 minutes, and the first reel was sufficiently good to be wound off on the machine winder. The machine is capable of an operating speed of 3,000 feet per minute and has a Twinver press section

A duplicate size number three paper machine was brought into operation in January, 1957, and the speed of this machine was gradually increased over the succeeding months which enabled a new world production record to be established on December 18, 1957. On this date, this machine produced 380.3 tons for the 24-hour period, at a machine speed of 2,446 feet per minute, trim width of 251.2 inches, pounds per inch of trim of 2,984, and a machine crew efficiency of 95.3 per cent. During an experimental speed trial which was made on September 17, 1958, this machine attained a maximum operating speed of 2,510 feet per minute.

Nicolet Paper Co. Expanding

Nicolet Paper Corp. is enlarging its paper mill at West De Pere, Wis. with a $4 million project involving a new paper machine.

Application by Nicolet for a permit to construct a machine room over the Fox River has been formally approved by the Wisconsin Public Service Commission. Public Service Commission approval was required since the addition will be constructed on piers over the river at the northeast side of the present machine room. The project will expand machine room facilities at Nicolet by an additional 340 by 60 feet, it was stated in the hearing.

Nicolet specializes in the manufacture of glassine papers and has two paper machines now in its mill.

Expansion at Provincial

An immediate start on a general expansion of manufacturing facilities of Provincial Paper, Ltd., was announced at the year end. This expansion is designed to provide increased production of the fine paper grades being manufactured at the present time.

Part of the program will be the installation of a trailing blade coater. The trailing blade coater will be used to supplement conventional roll-coating.

North Carolina Pulp Buys Bate Lumber

The Bate Lumber Co. of New Bern, N. C., with timberland in Craven and Beaufort counties, was sold to the North Carolina Pulp Co., late in December.

Unofficial reports placed the sale price in the neighborhood of 15 million dollars.

The North Carolina Pulp Co. is a subsidiary of Weyerhauser Timber Co. The pulp company made a similar purchase about three years ago, paying about 13 million dollars for the holdings of the Eureka Lumber Co.

Rhinelander $4.5 Million Project

Rhinelander Paper Co., a division of St. Regis Paper Co., announces the completion of a $4.5 million modernization project to improve both steam and electric generating capacity at its Rhinelander, Wisc. location.

Begun in the spring of 1957, the project includes the construction of a new building to accommodate a new boiler; a water treatment plant; and a turbine generator of the extraction back-pressure type.

The addition to the Rhinelander plant is a modern building, built of concrete, steel and transite, is 58 x 71 feet in size, and is 127 feet high. The new boiler, costing $1,320,000 without auxiliary equipment, has a capacity of 260,000 pounds of steam per hour at 1,500 pounds pressure per square inch at 950° F., and is capable of evaporating 600 gallons of water a minute at full capacity.

A water treatment plant, costing approximately $160,000, has been erected adjoining the boiler plant. It filters and de-mineralizes water from the Wisconsin river.

A turbine generator of the extraction back-pressure type has also been installed as part of the new system. It has a rated capacity of 10,000 kilowatts at 12,500 volts. It takes steam at 1,500 pounds pressure, extracts it at 40 pounds pressure and exhausts at 125 pounds pressure. Cost of the basic turbine and generator was approximately $579,068.

Scott Enlarging Facilities at Everett

Scott Paper Co., will make a substantial addition to its present Everett operations through construction of a new finished paper product warehouse and shipping building. Due to recent developments in marketing policies and techniques, new demands on the Scott traffic division cannot be economically met with existing distribution facilities. The current consumer demand for color, multiple-roll packages, assorted colors and new products has resulted in a very substantial increase in the number of Scott products in distribution. Consolidation of mill and warehouse will effect many advantages in filling complex orders, thereby, providing more efficient customer service in the more than eleven western states served by the Everett plant.

Scott's new West Coast distribution center will be a three-story structure of reinforced concrete, erected on concrete pilings and covering approximately 90,000 square feet on each floor. The building will be constructed in the shape of the letter "T", 431 feet across the top and 398 feet from top to bottom of the "T".

Believed to be one of the largest paper warehouses and shipping installations in the Northwest, the building will have facilities for

simultaneous loading of twelve freight cars and six trailer trucks.

An important feature of the new project will be the construction of an overhead conveyor system that will bring cases of paper products to the new warehouse and shipping building from the existing Paper Mill at the north end of the Scott property.

The enclosed conveyor bridge will be almost 50 feet above ground level and carried on a steel structure extending over the entire 1100-foot distance between the existing finishing building and the new paper and shipping warehouse.

Lower Michigan Pulpwood Research Incorporation

Signing articles of incorporation of the Lower Michigan Pulpwood Research Ass'n., Inc. are: (Front row, left to right) Treasurer Arthur Koller, Filer City; President Roman J. Suess, Otsego; First Vice President John N. Fields, Muskegon. (Back row): Director Rowland Blair, Filer City; Second Vice President A. J. Auden, Alpena; Secretary Charles G. Allen, Detroit.

Development of Lower Michigan's forest resource will get a further boost through incorporation of the Lower Michigan Pulpwood Research Ass'n. (LMPRA), said Association President Roman J. Suess of the Otsego Falls Paper Mills, Otsego.

Articles of incorporation for LMPRA were filed Monday. Filer City was selected as the organization's headquarters.

Four other companies participating in LMPRA and their representatives to the association are: S. D. Warren Co., Muskegon, John N. Fields; Abitibi Corp., Alpena, A. J. Auden; Scott Paper Co., Detroit, Charles G. Allen; and the American Box Board Co., Filer City, Arthur P. Koller and Howland W. Blair.

LMPRA, founded by officers of the five named pulp and paper companies, is devoted exclusively to the sponsoring of forest research and public instruction related to forest management.

West Virginia Further Expanding Mill and Converting Operations

West Virginia Pulp and Paper Co. is planning further expansion of its converting operations, which now manufacture into finished products nearly 25 per cent of the company's output of paper and paperboard, David L. Luke, president, announced Jan. 5, in the company's annual report to stockholders.

Mr. Luke noted that new converting operations acquired during the past year had helped push the company's sales for the fiscal year ended Oct. 31 to a new high of $208,109,000, as compared with $199,954,000 in sales reported on a pro forma basis for fiscal year 1957.

$50 Million at Luke

A major expansion of the company's primary papermaking operations is being carried out at the Luke, Md., mill, where a $50,000,000 building program began this past year. The project will add two paper machines at this location, doubling the mill's production of white papers by the mid-1960's.

Mr. Luke reported that the company had invested nearly $33½ million in plant additions during 1958 and indicated that a comparable outlay was projected for 1959.

Converting Operations

The company's new plant at Torrance, Calif., established in mid-1958 for the manufacture of multiwall shipping bags, ultimately will become a focal point for the production of grocery bags, supermarket checkout bags, shopping bags and corrugated shipping containers for West Coast markets. The California plant, the company's first manufacturing operation west of the Rockies, is one of four multi-wall operations established during the past year. The other plants are located at New Orleans, St. Louis and Wellsburg, W. Va.

In addition to multiwall bags, the company expanded its converting operations into the grocery bag and folding box fields during the year.

The company began making grocery bags for national distribution at a new plant started last January at Charleston, S. C. Since the startup the original capacity of the bag plant has been doubled and will be increased further to meet a growing demand.

The operations of Virginia Folding Box Company of Richmond, Va., a subsidiary acquired early in 1958, are being broadened into other markets. The subsidiary now is one of the nation's largest producers of packaging for the tobacco industry.

Paper and Board Expansion

Mr. Luke said that production of Clupak paper is being stepped up by the addition of a second extensible unit on a kraft machine at Charleston, S. C., giving the company a potential capacity of 180,000 tons a year.

The report disclosed that the company now has pilot equipment capable of putting stretch into paper in an isotropic pattern—an equal amount of stretch in all directions. The stretch in present grades of Clupak is largely one way, in the machine direction. This advance adds not only to the paper's toughness, but broadens its versatility to a point where future applications could be almost limitless, the report said.

Production of coated paperboard

also is being increased by the addition of a second special coating unit on a paperboard machine at Covington, Va., mill, which is the principal producer of bleached boards for the company.

Paper Week to Feature Research

A jointly sponsored research symposium will be presented by TAPPI and APPA on Thursday afternoon, February 26, in conjunction with Paper Week. Featured speakers at this symposium will be Lt. Gen. James M. Gavin, vice-president of Arthur D. Little, Inc.; A. B. Layton, president of Crown Zellerbach Corp.; and Howard S. Turner, vice-president of Jones & Laughlin Steel Corp.

This program is being held in an effort to alert the paper industry to the present need for more intensive research and a more intelligent administration of such research. This joint program underscores the strong concern within the two associations for increased research to the nation's fifth largest manufacturing industry.

Gen. Gavin, wartime commander of the 82nd Airborne Division and recently retired Chief of the Army's Research and Development, will deliver the keynote address, "Research in the Space Age." Mr. Layton will then discuss "What Top Management Expects from Research and Researcher." The third paper will be delivered by Mr. Turner, who will discuss "What Research Expects of Management."

After the papers have been presented the audience will have an opportunity to question a panel of research management experts.

Paper and Board Production

According to the American Paper and Pulp Assn., the ratio of the United States production to mill capacity for the week ending December 27, 1958, was 51.8 per cent compared with 92.4 per cent revised for the preceding week. The ratio was 49.4 per cent for the corresponding week a year ago.

The paperboard production ratio for the week ending December 20, 1958, was 91 per cent compared with 91 per cent for the preceding week and 93 per cent for the corresponding week last year.

(Detailed statistics on page 60.)

PJT PAPER PEOPLE

D. S. Brown

W. R. Csellak

Brown, Csellak Named VPs with Gardner

Duncan S. Brown and William R. Csellak have been appointed vice presidents at The Gardner Division, Diamond Gardner Corp., of Middletown and Lockland, Ohio.

Mr. Brown becomes division vice president of manufacturing, paperboard, and Mr. Csellak, vice president of manufacturing, cartons.

Mr. Brown will be responsible for the manufacture of paperboard by The Gardner Division's three mills at Middletown and Lockland, while Mr. Csellak will be responsible for the manufacture of cartons and retail boxes at Gardner's fabricating plants at Middletown and Lockland.

Armstrong Forest President Retires

The retirement of E. O. Ehrhart at the end of this year as president of the Armstrong Forest Co., a subsidiary of New York & Pennsylvania Co., Inc., has been announced. He has been with the company for 43 years. Top executive responsibilities for Armstrong will be assumed by Arthur L. Bennett, vice president.

Mr. Ehrhart has had a long and distinguished career in forestry, both inside and outside of his company. He has been intimately connected with many developments which have become standard practice in the management of woodlands and in the pulpwood industry.

Ex-Marathon Chief Retires

John Stevens, president and chairman of the board of Marathon Corp. before its merger with American Can Co. last December, announced his retirement as an officer and director of the parent company. His resignation was effective at once.

Officers Named at Boise

Election of Stephen B. Moser of Yakima as a vice president of the Boise Cascade Corp. was announced by R. V. Hansberger, president.

Mr. Moser is a native of Seattle and a graduate of the University of Washington.

Mr. Hansberger also announced the merger of the Cascade Lumber Co. with the Boise Cascade Corp. Cascade Lumber, with head offices in Yakima, has been operating as a subsidiary of the Boise Cascade Corp.

Harding Asst. Supt. Paper Machines

Perry A. Harding has been appointed assistant superintendent paper machines of the Otis Division, International Paper Co., Chisholm, Maine, it was announced by A. B. Copping, assistant manager.

Mr. Harding was employed by International in November of 1947 as assistant chemist and was transferred in 1954 to assistant night superintendent and in 1956 to night foreman paper machines.

Mead Promotes Three Research Staff Members

Promotion of three staff members of the Research Department of The Mead Corp., effective early in 1959, is announced by G. H. Pringle, executive vice-president, manufacturing, and R. H. Savage, vice-president of research.

Dr. E. S. Flinn, assistant director of chemical research, has been named assistant to the president at Hurlbut Paper Co., a Mead wholly-owned subsidiary, and will transfer to South Lee, Mass. Henry G. Caldwell, group manager, pulping and bleaching, will succeed Dr. Flinn and Karl W. Meschke will assume Mr. Caldwell's duties. Dr. Flinn joined The Mead Corp. in 1945 as manager of the tannin extract division at Lynchburg, Va. He remained in that post until his appointment as assistant director of chemical research at Chillicothe, Ohio in 1953.

Henry G. Caldwell joined The Mead Corp. in 1946 as staff engineer in research and development at Chillicothe. In 1953 he was promoted to group manager, pulping and bleaching, position he held at the time of this promotion to assistant director of chemical research. The job title will be changed to assistant director of present product research when he assumes the post after the first of the year.

Karl W. Meschke, native of Bogalusa, Louisiana, graduated from Georgia Institute of Technology in 1951 with a degree in chemistry.

He joined the Brunswick Pulp and Paper Co., Brunswick, Ga., as a process engineer. Brunswick Pulp and Paper Co. is jointly owned by The Mead Corp. and Scott Paper Co. In July, 1957 he was transferred to Chillicothe as a chemist in the pulping and bleaching section of the research department.

Dr. E. S. Flinn

H. G. Caldwell

Riegel Realigns Carolina Div. Personnel

A realignment of executive responsibilities at the Riegel Paper Corp., Carolina division has been announced by Dr. C. E. Hartford, vice president and manager of that division.

Dr. A. L. M. Bixler has been named manager of manufacturing services with responsibility for all technical, engineering, traffic, stores and purchasing functions for both pulp and paper manufacture. A. L. Wiley will continue as assistant to Dr. Bixler.

J. D. Dailey was made manager of pulp and paper production. In addition to being responsible for pulp and paper production, Mr. Dailey will also be responsible for the maintenance, wood, power, electrical and instrument departments.

J. R. Compton, division controller, will be responsible for all accounting and controller functions. The manager of costs, standards and budgets; the manager of general accounting and the plant cost analysts, will report to Mr. Compton.

In connection with the above realignment the following promotions were announced: C. C. Peters to assistant manager of production; T. J. Kayhart to chief engineer; R. O. Brandt to power plant superintendent.

Asst. Manager of Int'l

Orren R. Hurd has been appointed assistant manager of International Paper Co.'s Otis Mill in Chisholm, Maine, it was announced by George H. Rand.

Mr. Hurd joined International as a laborer at the Riley Mill in Maine, the same year transferring shortly to the company's nearby Otis Mill in Chisholm.

He was named night foreman of paper machines in 1955 and the following year became paper mill superintendent, which position he held until his present appointment.

Hart Gets Post with Romar

Romar Tissue Mills, Inc., of Wheelwright announced it has engaged Raymond G. Hart as director of quality control.

Mr. Hart has served as control chemist with Crane & Co. of Dalton, as a paper chemist in the research dept., of Borden Co., Chemical Division, Bainbridge, N. Y., and more recently in a supervisory capacity with the Stevens Paper Mills, Westfield.

Romar Tissue Mills, Inc., was organized in June, 1957, and has been operating the former Doeskin Plant in Wheelwright.

Retirement At MacAndrews & Forbes

MacAndrews & Forbes Co., announces the retirement of W. E. Wickham on January 2. Mr. Wickham joined the company in 1911. Mr. Harold Shannon succeeds Mr. Wickham as superintendent.

Swartz Promoted at Bowaters

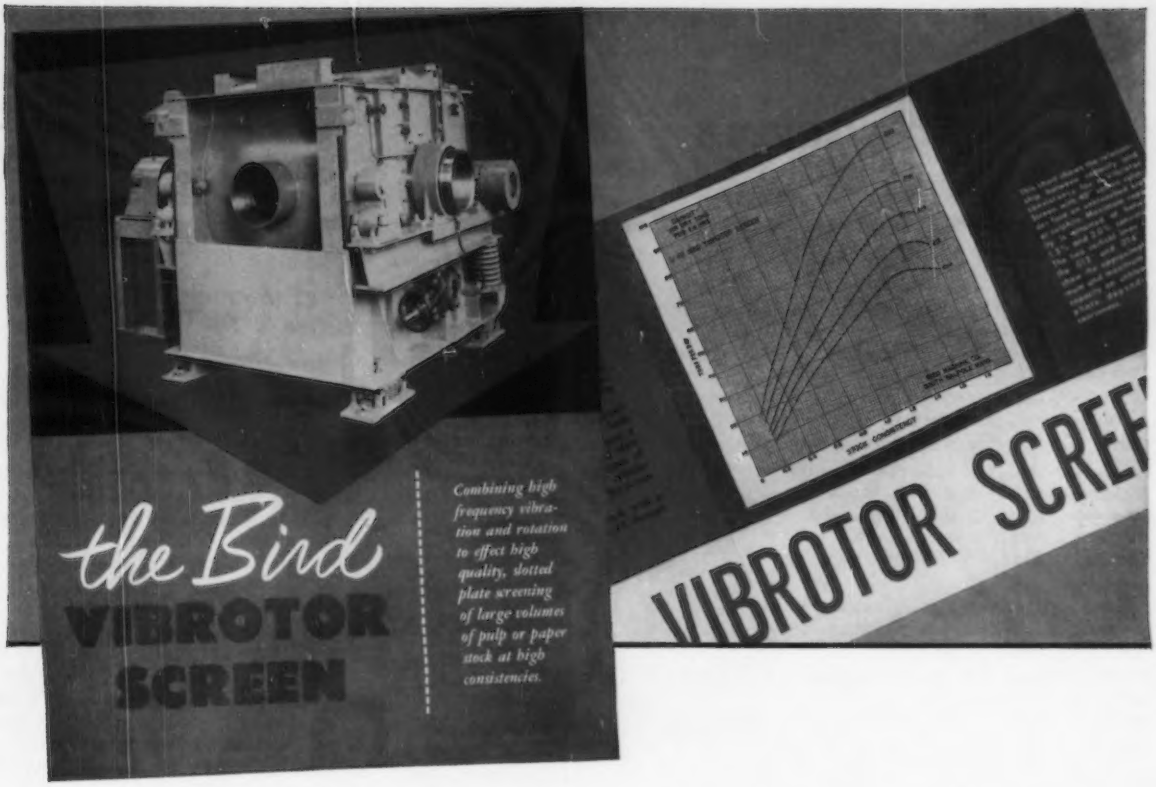
Promotion of Dr. Joseph N. Swartz to technical director of Bowaters Southern Paper Corp. of Calhoun, Tenn., was announced.

In his new position, Dr. Swartz will continue to head the technical department of the mill at Calhoun and will also act as technical advisor to the general manager of Bowaters Carolina Corp. In addition, he will be responsible for research projects being conducted at the mills or at research centers for the companies, directing his attention primarily to quality improvement and process development.

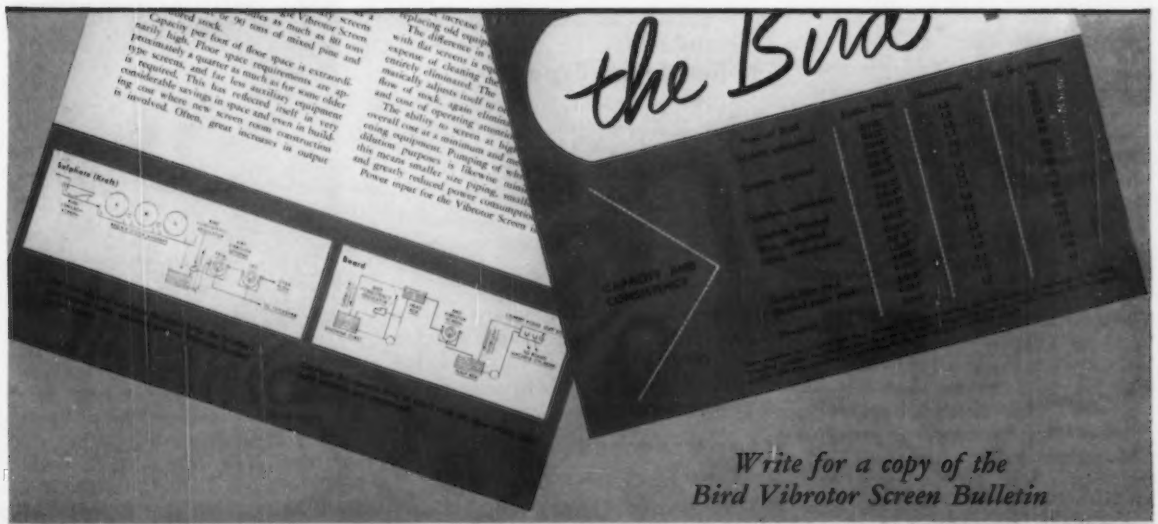
Dr. J. N. Swartz

A native of Montreal, Canada, Dr. Swartz graduated from McGill University in 1934. He received his doctorate in industrial and cellulose chemistry at McGill in 1937.

Dr. Swartz joined Howard Smith Paper Mills in 1937 as a research chemist. From this position he advanced to plant control and then to operations and development.


the Bird
VIBROTOR
SCREEN
Combining high frequency vibration and rotation to effect high quality, slotted plate screening of large volumes of pulp or paper stock at high consistencies.
VIBROTOR SCREE

"How to Screen High Consistency Stocks in Small Space at Low Cost"



Write for a copy of the Bird Vibrotor Screen Bulletin

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PJT NEWS OF CONVERTERS

Instrument Tests Erection Force of Cartons

A simple, accurate test instrument, called the Hunter Carton Scorebend Tester, has been developed by the Hunter Spring Co. to measure the force required to "break-open" flat folded paperboard cartons. The instrument is designed to help carton manufacturers control production quality and eliminate rejects, and to enable users of automatic cartoning machines to specify cartons to a recognized standard and discover "tough" cartons before they can cause filling line slowdowns and stoppages.

This inexpensive tester is designed to provide simple, one-man production testing with laboratory instrument precision. The tester employs a precision direct-reading force gage which is column mounted to accommodate folding cartons up to 22-in. wide when flat. To perform the test, the flat carton is simply inserted on edge between the grooved base and the notched compression head of the gage. The inspector then merely turns a knob to depress the gage and force the carton open. The fully-jeweled indicator hand holds the maximum dial reading to show the actual opening force exerted.

Upon release of the control knob, the gage returns automatically to the starting position and is ready for the next carton. When the force reading has been noted, the gage is reset simply by touching a release tab. Since only a single indicator hand is used there is no follower hand to be turned back to zero.

Three models of the Scorebend Tester are available: Model CC-500 for forces ranging from 0 to 500 grams; Model CC-1000 for forces ranging from 0 to 1000 grams; and Model CCO-1 for forces ranging from 0 to 16 ounces. The only difference between models is the force gage with which it is equipped and all three gages are interchangeable on the standard test stand and mount. Each gage has an accuracy of better than 1 per cent of full scale, and dial indicator hands can be made free-moving or set to hold the maximum reading by a control button.

Further information may be obtained from Apparatus Division, Hunter Spring Co., 1 Spring Ave., Lansdale, Pa., or from Testing Machines, Inc., 72 Jericho Turnpike, Mineola, N. Y.

Named to Board At Sutherland

James T. Kirkpatrick was named a member of the board of directors of the Sutherland Paper Co. Dec. 23. He is the company's vice president in charge of sales.

Associated with Sutherland for 20 years, Mr. Kirkpatrick began as a salesman for the company. He became manager of the service department in 1942; manager of the Paraffined Carton Sales Division in 1944 and assistant to the vice president of sales in 1952. He later became general sales manager and was made a vice president in 1954.

Can Co. Plant Slated

Continental Can Co. of Canada, Ltd., will start building a plant at Chatham, Ont., early next month. Thomas C. Fogarty, president of the U. S. parent company, said the one-story structure would be on a 116-acre site.

Miller Plans Expansion

Walter P. Miller, Inc., plans to increase the production capacity of its plant in Philadelphia by 40 to 50 per cent this year.

The increased production and sales will be made possible by the acquisition of the business and assets of Niagara Box Co., Inc., of Fairlawn, N. J.

Both firms manufacture set-up paper boxes. The plant of Niagara Box in Fairlawn will be closed and its production facilities moved to Miller's plant here.

Lowe Succeeds Wilson at Burt

Raumond J. Lowe, general manager of F. N. Burt Co. Inc. since 1956, has been named vice president to succeed William C. Milsom, whose retirement became effective Dec. 31.

Mr. Milsom started with Burt in 1922 in a manufacturing-supervision position. He became general factory superintendent in 1940, general manager in 1948 and vice president in 1956.

F. N. Burt will consolidate all Buffalo operations in a new $4,250,000 plant now under construction in New Walden Ave., Cheektowaga. Transfers of operations probably will start next June and be completed next August, Mr. Lowe said.

Plant Manager Named at Business Forms

Charles H. Walters, president of Walters Business Forms Inc., announces the election of Anthony C. Ferrara to be general manager at the Bloomfield plant.

Mr. Ferrara comes to Walters from the Arco Manifold Co., of New York City and studied at MIT in Cambridge, Mass.

Recknagel GM of St. Regis Div.

St. Regis Paper Co., announces that Bernard W. Recknagel has been appointed general manager of the newly-formed Flexible Packaging Products sales division, effective January 1, 1959.

This new division includes the present Multiwall Packaging sales division, which continues under the direction of Charles A. Woodcock, assistant vice president.

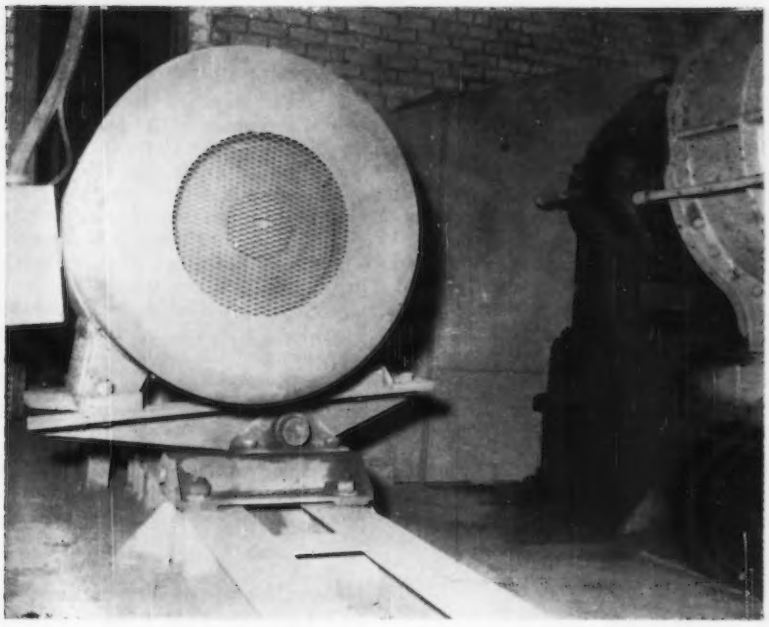
The Flexible Packaging Division

B. W. Recknagel

is responsible for exploring, developing, and organizing the marketing and sales possibilities of other flexible packaging product lines which may fit appropriately into the objectives and scope of this new sales division.

Mr. Recknagel, who is an assistant-vice president of St. Regis, has been with the company since 1935. He has served as price policy coordinator for sales and been in charge of bag making equipment sales.

NEW EQUIPMENT & SUPPLIES



Pivoted motor base (above) supports 200 h.p. motor driving pressure blower called Tens-A-Matic bases they are said to improve belt drive performance by matching tension to the load, by maintaining belt alignment, eliminating belt slip and giving automatic take-up. Maintenance on belts and bearings is greatly reduced. Sizes for 1 h.p. through 200 h.p. motors are available. For more information contact Industrial Marketers, 2505 Pinecrest, Ferndale 20, Mich.

Complete Asphalt Dispersion Claimed for Compound

Nearly four years of concentrated effort on the asphalt dispersion problem in both the laboratory and mill has resulted in Phaltless Compound 32 . . . a simple liquid chemical additive which does a thorough job of dispersing asphalt under a potentially wide variety of mill conditions. Further, it appears that proper agitation in the pulper is the really only important factor involved. Optimum conditions of agitation will assure maximum dispersion of the separated and treated asphalt throughout the mass of the slurry.

The preferred procedure is to add the compound directly to the pulper together with the waste paper furnish in predetermined and controlled amounts. Use percentages are based on the total volume of water present and will vary from 0.1 to about 0.3 per cent, at consistencies up to 4 per cent, depending upon conditions of total asphalt present in the average furnish, type of agitation, retention time, temperature and pH control. Temperature and pH can largely be ignored in the deasphalting system if optimum agitation prevails. Retention time is a factor in the use requirements of Phaltless for two reasons. Firstly, the longer the reaction time permissible, the lesser the amount of compound usually required. Secondly, maximum retention time is mandatory under conditions of least ideal agitation.

Pulping equipment such as the DynoPulper and Morden Slushmaker, because of the type and degree of agitation involved, are said to provide excellent dispersion results at minimum use percentages of Phaltless 32 and minimum retention times. Typical examples would show complete dispersion of 1 per cent asphalt in about 10 to 15 minutes at use percentages of 0.15 and 0.2 per cent temperatures of 115 to 130° F and pH values of 6.0 and 10.0 to 11.0.

The average beater will provide the least ideal type of agitation for use in conjunction with the new deasphalting system. While many of them will perform satisfactorily at consistencies of 4 per cent and below, the generally low speed of the travel or agitating cycle of the stock will require more careful attention to temperature, pH control and retention time at moderate percentages of use of P-32.

Recognized mill and laboratory authorities have established that the compound has no material effect, one way or the other, on the strength or folding properties of the sheet. Likewise, that the treated furnish can be satisfactorily sized with normal or commercially acceptable quantities of size and alum. There is no residual odor in the finished sheet. For further information contact R. C. Barbour, 166 East 35th Street, New York 16, N. Y.

Adjustable Joints for Spray Nozzles

Three new, large size adjustable joints have been added to the Spraying Systems Co. line, for use in spray nozzle installations where variable angular adjustment of the nozzle is desired. These new adjustable joints are for large capacity nozzles with 1½ inch, 2 inch and 2½ inch NPT connections. Ball joint design permits positioning at any point over a 40° included angle and 360° rotational range. With these new products, Spraying Systems now offers adjustable joints in all sizes from ¼ inch to 2½ inches. For complete information write for Data Sheet 8088 to Spraying Systems Co., 3220 Randolph Street, Bellwood, Ill.

Sulphite in Boiler Water Determined by New Method

Betz Laboratories, Inc., consultants on industrial water problems, has available a new method for the determination of sulphite in boiler water. This procedure eliminates the use of 50 per cent sulfuric acid and starch solution, formerly used. In the new method, these reagents are replaced by the Betz Dry Sulfite Indicator.

The method for making the sulphite determination is as follows: The water sample should be freshly obtained with as little contact with air as possible. Do not filter. Cool to room temperature (70-80°F.). Measure 100 ml. of the water sample with

the graduated cylinder and transfer to casserole.

Use the plastic dipper to add one dipperful of the dry sulphite indicator to the sample. Stir thoroughly, and then titrate with potassium idodide-iodate solution until a faint permanent blue color develops in the sample. This color change is taken as the endpoint. Record the potassium iodide-iodate solution used. Using a 100 ml. sample, p.p.m. sulfite as SO_3 equals ml. potassium iodide-iodate required multiplied by five.

Complete details and prices of the Betz Sulfite determination are available by writing Betz Laboratories, Inc., Gillingham & Worth Streets, Philadelphia 24, Pa.

Full Identification of Printed Weights

Major advantages designed to increase the effectiveness of coat control data, including full identification of printed weights, are claimed by Toledo Scale in their announcement of the new Printweigh "400" series.

According to the announcement, Toledo's new Printweigh "400" Scales offer the printing of weight data in large, clear figures anywhere on office forms or tickets up to 8½ x 11 inches in size. This Toledo product always prints a complete weight

figure, even when unit weights are used to increase dial capacity.

To supplement the basic weight information, Toledo offers a wide choice of optional features to identify printed weights for more complete cost data recording. These include: 1) Selective Numbering, with from six to as many as twelve banks of keys, conveniently located on a keyboard on the front of the Printweigh; 2) Weight Identifying Symbols actuated by a ten-key keyboard located on the front of the scale for identifying items being weighed; 3) Automatic Consecutive Numbering, which consecutively numbers each printed weight; and, 4) Automatic Time and Date Mechanism, which automatically records the time and date of each weighing. All supplementary data appears to the right of the weight figures on the Printweigh record.

To meet modern day requirements, the Printweigh "400" is available for the transmission of digital weight data to remotely located adding or other office machines. It is also pointed out that this new series may be provided with a "memory" to record weights at the scale, or transmit digital data even after the load is removed from the platform. Another load can be placed on the platform without affecting the stored data.

The Printweigh "400", which is applicable to new Toledo 20 inch dial models, is noted for its unusual printing speed. This stems from simplicity of construction based on the Toledo select-mechanism's single coding disc. There is no contact between the weighing and printing mechanism except at the instant the weight is being sensed.

Complete illustrations and description of this equipment may be obtained by writing Toledo Scale, Division of Toledo Scale Corporation, Toledo 13, Ohio.

Narrow Aisle Lift Truck With 24-Volt Power

A new narrow aisle, electric powered lift truck incorporating a 24 volt electrical system which with a host of design innovations to increase operational efficiency provide for the accomplishment of more work has been introduced by the Yale & Towne Manufacturing Co. The new trucks are built in 2000, 3000 and 4000 pound capacity straddle-stacker models all of which will work comfortably in aisles less than six feet with normal loads.

These lift trucks incorporate design features of improved operator visibility, convenient placement of controls, easy accessibility of all working parts for service and the provision of operational accessories to increase the efficiency of the operator.

Provision of a 24 volt electrical system in the new Yale Warehouser increases the overall operating efficiency of the truck by lowering the amperage required to move and raise loads. The higher voltage provides a high speed of lift and the capacity to work a full shift under severe duty cycle conditions with no loss of efficiency. An increase of travel speed within the limits of safe operation is also achieved with the 24 volt system. Another advantage of the increased power is the potential it creates for the use of a wide variety of hydraulic attachments on the Warehouser truck.

The new Yale Warehouser line is also built in 12 volt system models for applications with lower power requirements and lighter duty cycles. An exclusive feature in the new Yale trucks is the provision of a direction indicator mounted in the hub of the steering wheel. An arrow in the indicator informs the operator of the direction in which the wheels are turned at all times.

Another standard feature on the new Warehouser is the placement of an operating hour meter in the dashboard of the truck. By affording a quick means of determining the exact amount of operation of the truck in a given time, the meter can serve as a guide to the most effective truck utilization for the user. The hour meter also provides a simple means for keeping track of maintenance scheduling of the unit.

The operating handles of the new Warehouser, for direction control, hoist and lowering operations are of a pistol grip type, located conveniently and canted at an angle which gives comfortable wrist action in operation.

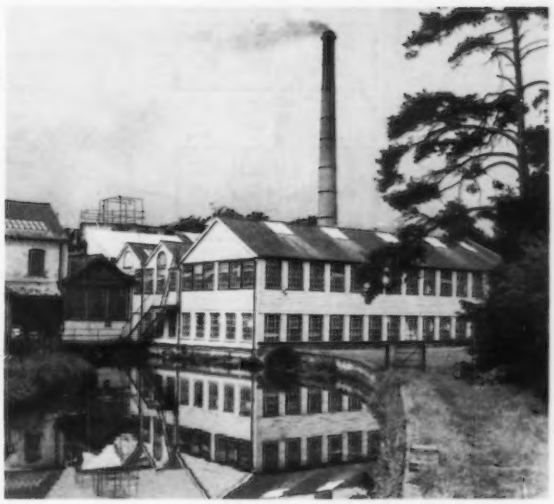
New Chemical Treatment for Longer Felt Life

Most recent among new developments stemming from Huyck Felt Company's extensive and continuing research at Rensselaer, New York is a chemical treatment called HUY-5. Developed especially to improve performance and increase service life of felts running high brightness board and market pulp, the new, all-purpose, natural color treatment is said to give felts outstanding resistance to wear, bacterial and chemical attack, shrinkage or felting, changes in running size and hair shedding.

The new HUY-5 chemical treatment has been thoroughly tested and proved by Huyck's laboratory and pilot plant operations and has undergone exhaustive testing afield in the past two years. A company spokesman stated that the need for the new treatment has been strongly expressed by operators of high brightness board and market pulp mills who have attended Huyck Felt Workshop sessions. Reports from mills producing food board, pulp, white patent coated and coated, bristol and mounting board, bleached manila and bleached tag stock, reveal that the new chemical treatment is making a major contribution to increased production, improved product quality and lower felt cost.

Towgood Mill Is Small But Modern

Over 200 years old, this rag mill remains small in size in order to give individual attention, yet employs the latest techniques and is thoroughly instrumented.



Eben M. Whitcomb
Editor-in-Europe
Paper Trade Journal

The Towgood mill, located in Sawton, Cambridge, known better perhaps as East Anglia, in England, has been producing fine, and industrial papers for over 200 years. In line with their policy, as a Spicer's group company, to remain small in order to give individual attention, the plant has for many years remained static in size but active in employing modern techniques and equipment.

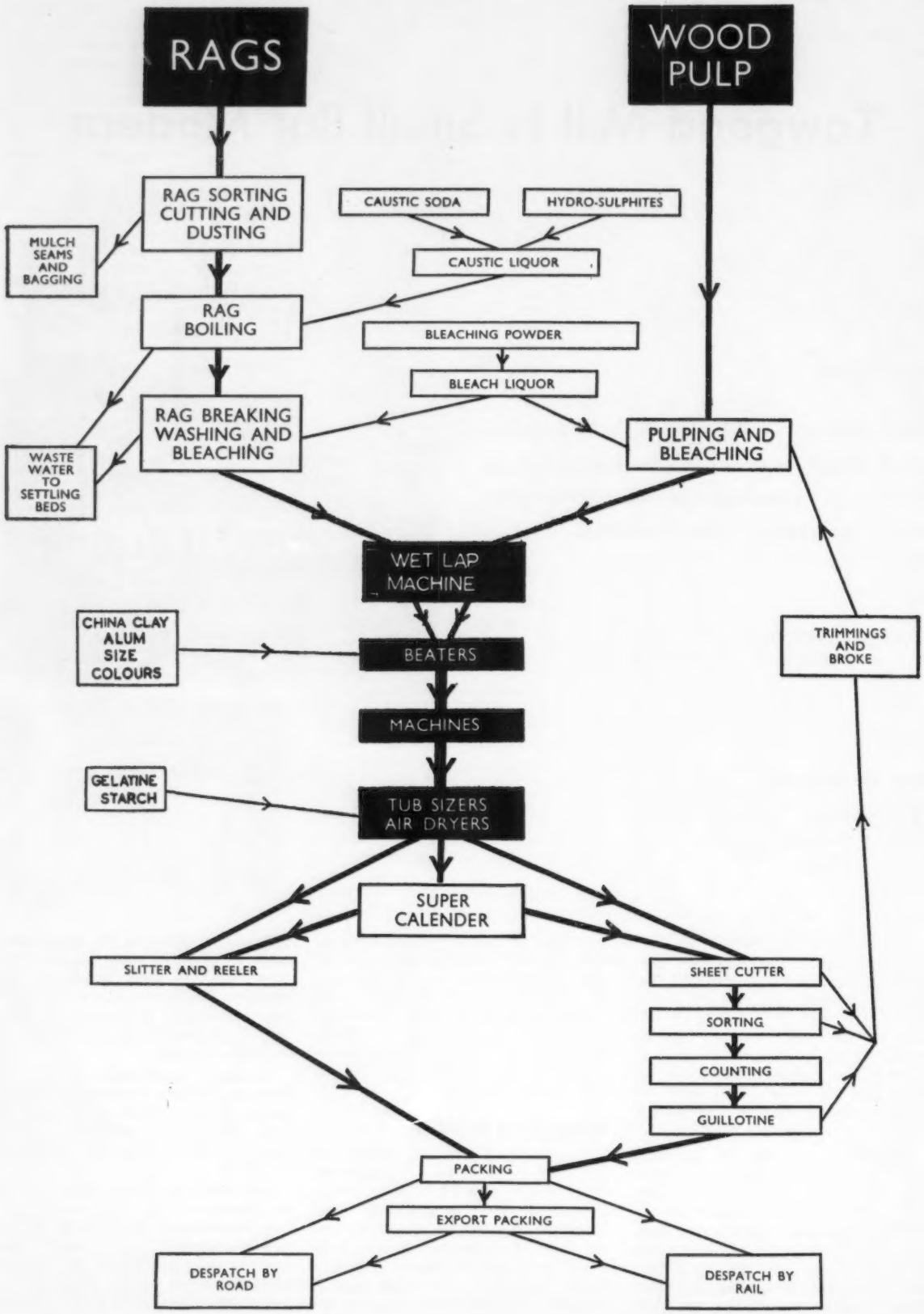
Basically a rag mill, the Towgood mill, like many in England is utilizing more cotton linters as a prime fiber. However, the operations of sorting, stripping, cutting, and dusting with conventional equipment are much in evidence in their rag rooms. Royal mail bags and cotton stockings form a major part of the rag fiber. Rag stock is cooked in horizontal rotary digesters using caustic soda and zinc hydrosulphite. After draining the cooked stock is bleached using sodium hypochlorite in tile lined beaters of 1000 pound capacity. Waste from this and other operations is pumped to the settling basins which will be described later.

Unique Stock Washing

Towgood's utilize the entire wet end section from an old papermachine as a washer for bleached stock. Using a 60 mesh square wire, stock is carried over two suction boxes and the sheet is caught at the couch by a belt conveyor and transferred to a slush tank. From this tank pulp is pumped to Umpherson beaters for preparation for the 58 inch paper machine. Conventional beaters prepare stock for their larger 64 inch machine. The latter uses alpha grade pulp the larger portion of the time for the production of laminating base (micarta) stock.

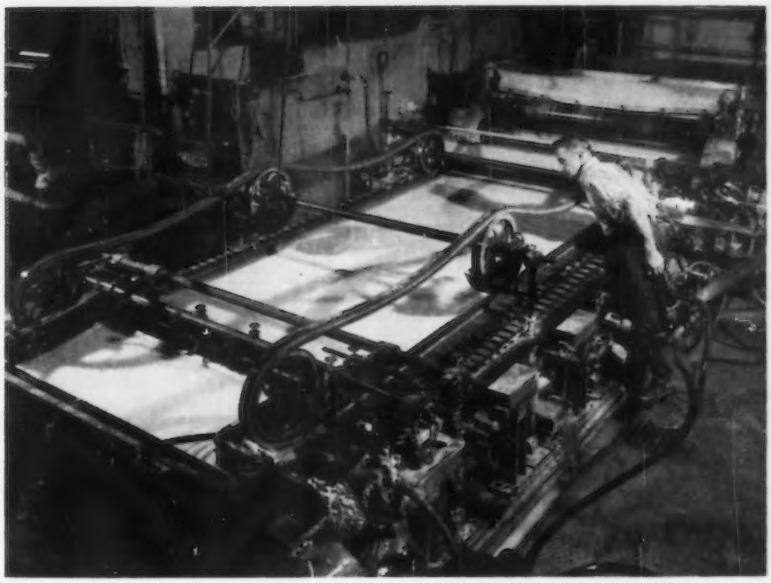
A Jones pulpmaster is used to break up broke and services both machines. Jones refiners are used with steel fillings for refining on both machines. Sall consistency regulators are used.

Although their two machines are of different width they are built in the same style. Two slices at the headbox each of which is split permitting reducing deckle by overlapping the slices as the deckle straps are moved in. Leith Walk screens,


RAGS
WOOD PULP
RAG SORTING CUTTING AND DUSTING
MULCH SEAMS AND BAGGING
CAUSTIC SODA
HYDRO-SULPHITES
CAUSTIC LIQUOR
RAG BOILING
BLEACHING POWDER
BLEACH LIQUOR
RAG BREAKING WASHING AND BLEACHING
WASTE WATER TO SETTLING BEDS
PULPING AND BLEACHING
WET LAP MACHINE
CHINA CLAY ALUM SIZE COLOURS
BEATERS
TRIMMINGS AND BROKE
MACHINES
GELATINE STARCH
TUB SIZERS AIR DRYERS
SUPER CALENDER
SLITTER AND REELER
SHEET CUTTER
SORTING
COUNTING
GUILLOTINE
PACKING
EXPORT PACKING
DESPATCH BY ROAD
DESPATCH BY RAIL

Left, Horizontal rotary digester being emptied after cook. Rag stock consists primarily of royal mail bags and cotton stockings.

Below, Wet end of paper machine. Two slices at headbox, each of which is split, permit reducing deckle by overlapping slices as deckle straps are moved in.



two suction boxes and a plain couch complete the wet section. Presses are straight. Also there are two, one of which is reverse, eight dryers complete the dry end of the machines which run about 100-200 feet per minute.

Instrumentation is Complete

Instrumentation is complete: automatic wet end pH control by Foxboro. Alum concentration is maintained automatically by an Adlow alum unit manufactured in Sweden. Each machine is equipped with a Baldwin substance gauge (Beta gauge) manufactured in Dartford, England. This type of unit is the deviation recording type receiving its signal from a stationary scanning head located in the machine. Moisture is recorded and sometimes controlled by a capacitance type unit at the dry end. Paper for air drying is put on the reel at about 10 per cent moisture.

Reels of paper in this state are then calendered, tub sized and air dried on conventional equipment as off machine operations.

Paper for plastic laminating is marketed in rolls while sheet stock is cut to register (localized water marks) on a Mason-Scott sheet cutter, then trimmed to size on a guilotine manufactured by Soag, London.

Water Supply and Effluent Disposal

Since the Towgood mill is not near a large natural water supply, process water is obtained by pumping from artesian wells. Effluent from the mill is accumulated and pumped continuously to a field of settling basins. Before pumping, the water is treated with Sodium Silicate, and flocculated with alum. As each basin is filled, it is then allowed to settle for 12 hours, then the supernatant liquid is decanted and piped to a nearby stream. The residual solids are pumped to a processing plant where a vacuum filter removes the solids in the form of a wet sheet. These solids are then sold to a moulded container manufacturer on a fiber basis.

Hand Operation

Another interesting product of the Towgood mill is the one-foot square filters about an inch thick made of 100 per cent cotton bleached fiber, for use by breweries in filtering beer. The manufacture is interesting because it is a hand made paper operation. A vat of stock is prepared, a vatman dips in and fills moulds, a coucher removes the mould and deckle, while a third man presses the piles of pads, then removes them to a drying room.

A SKILLED HAND IN CHEMISTRY...AT WORK FOR YOU

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plus Nopco Service

ASSURE SUPERIOR PAPER PRODUCTS

From the Nopco® line of paper chemicals come the agents that make good paper better.

From the Nopco research laboratories come the know-how and techniques amassed in more than 50 years of service to the paper industry—knowledge and facilities that are always available to you to help meet your special requirements.

Write today for complete information about Nopco paper chemicals, plus Nopco research facilities, available to you. You will find it profitable.

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New motor development obsoletes today's application practices!

Only from Allis-Chalmers!

Super-Seal motors save up to 60%

Here's an amazing advance in motor technology! It's the *Super-Seal* motor line—an open motor design so completely unaffected by moisture, dust, dirt, oil, acids and alkalies that it can be used in many applications previously requiring more costly enclosed motors. *Savings range from 15 to 60%.*

Super-Seal motor superiority results from two distinct revolutionary insulating techniques. Available in any integral horsepower size, smaller *Super-Seal* motors incorporate a *Poxeal* stator. A durable epoxy resin encloses the stator, creating an electrical system impervious to outside elements.

In larger sizes, *Silco-Flex* insulation is used. In this system, silicone rubber is vulcanized into a homogeneous mass to form a flexible, moisture and heat resistant, void-free dielectric barrier around coils and leads.

Both of these insulation systems are unsurpassed. Proof? An encapsulated motor ran for hundreds of hours at full load in a 4% brine solution.

Find out more by reading the next pages; then contact your A-C representative or distributor, or write Allis-Chalmers at address shown on back page.

A-C **ALLIS-CHALMERS**

518 9100

Two revolutionary insulating techniques developed and pioneered by Allis-Chalmers mean savings of millions of dollars for motor users . . .

New open motors are unaffected by moisture and contaminants

Modern insulating materials and new methods of application, now available in *Super-Seal* open-type motors, are drastically changing motor application standards. These insulations are so completely impervious to moisture and contaminants that *Super-Seal* open motors can be used in most applications formerly requiring costly enclosed designs. Existing applications have resulted in savings as high as 60%.

Basic insulation systems

Larger *Super-Seal* motors with form-wound stator coils use the *Silco-Flex* insulation system. Heart of this system is a remarkable rubber-like silicone elastomer, applied in semi-cured state and vulcanized to form a void-free, impervious dielectric barrier. More than four years of development and field testing have proven the superior electrical and physical properties of *Silco-Flex* insulation systems.

Stator coils of smaller random-wound motors are protected by equally effective *Poxeal* insulation system. A tough, durable case of epoxy resin completely seals the winding end turns and slot portions. Bonded to the stator laminations, it forms a seal completely impervious to contaminants.

Moisture resistance

In addition to being void-free, the silicone elastomer used in *Silco-Flex* insulation is moisture repellent. Even in high humidity, moisture does not form a surface film of condensation. Coils with this protection can operate completely immersed in water. In fact, one of the recommended cleaning procedures is use of detergent and water.

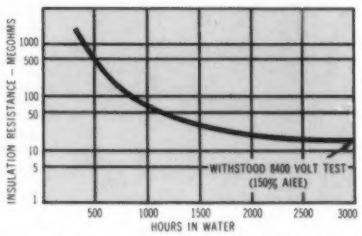


Fig. 1—Test curve shows insulation resistance of *Silco-Flex* insulation while immersed in water.

Moisture resistance of *Silco-Flex* coils is demonstrated in Fig. 1. After more than 3000 hours of total immersion with 2300 volts impressed on the coil, the test was terminated when it became apparent that little more drop could be expected in the coil's insulation resistance. At that point the coil still withstood a high potential test of 8400 volts without injury.

Encapsulated stator windings are equally well sealed. Motors with *Poxeal* insulation protection have been thoroughly tested under water while operating with full load and full voltage.

Resistance to contaminants

Silicone elastomers and epoxy resins are relatively inert to attack by practically all reactive agents. Further, the void-free construction of insulation systems used in *Super-Seal* motors prevents penetration of contaminants. As a result, *Super-Seal* motors are unaffected by oils, most acids, salt solutions, alkalies, and oils and are ideally suited for such applications.

Thermal stability

Temperature-wise, *Silco-Flex* insulation can easily withstand hot-spot temperatures of 200 C and more—

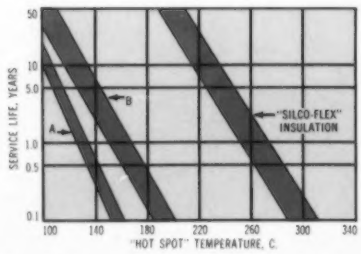


Fig. 2—Chart shows that *Silco-Flex* insulation more than meets Class H requirements.

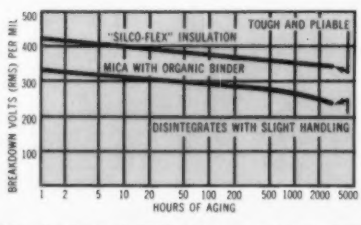
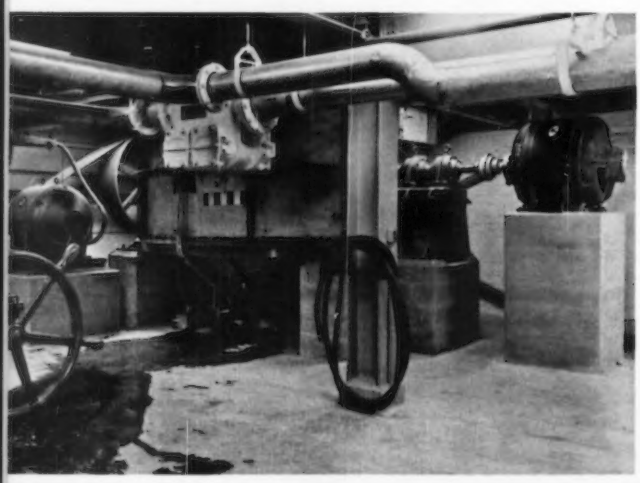


Fig. 3—Tests of 2300-volt insulated bars show thermal stability of *Silco-Flex* insulation.



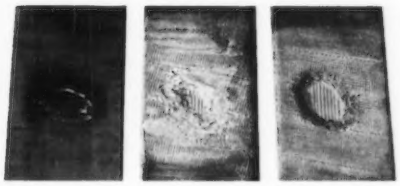
Paper mills have wide application for *Super-Seal* motors because of moist atmospheres.

easily meeting Class H temperature requirements (Fig. 2). At temperatures where the life of Class B coils would be measured in weeks, the life span of *Silco-Flex* coils is well beyond machine obsolescence.

Comparison with a mica-organic binder insulating system (Fig. 3) offers further proof of thermal stability. After 2000 hours of aging at 200 C with 8500 volts applied continuously, the *Silco-Flex* insulated coil was still tough, pliable, and completely serviceable. The mica-taped insulation had deteriorated to the point where it disintegrated readily and was completely useless.

An added advantage of *Silco-Flex* insulation is unusually high thermal conductivity — about twice that of conventional insulations. This means heat dissipates faster from its point of generation.

Poxeal insulation also demonstrates remarkably good thermal stability. Materials now in use are suitable for Class B temperatures, although actual classification of the insulation is determined by the basic material used.



Silco-Flex Insulation | **Polyester Mica Tape** | **Asphaltum Mica Tape**

Fig. 4—Samples of motor insulations after sandblasting give comparison of abrasion resistance.

Abrasion resistance

Resistance to abrasion is still another point of superiority in the insulation systems used for *Super-Seal* motors. Abrasion resistance of *Silco-Flex* insulation is compared to other types of insulation in Fig. 4. After one minute of sandblasting with 90-grit aluminum oxide and 100-psi air, only slight surface erosion appeared on the *Silco-Flex* sample. Other insulations were eroded to bare copper.

Application practices obsolete

The superior qualities of *Super-Seal* insulating systems, developed by Allis-Chalmers, make it necessary to reappraise present application practices. With virtually ageless insulation, *Super-Seal* motors assure more reliable service and require less upkeep than the best protected, conventionally insulated machines — and at considerably less cost.

Super-Seal, Poxeal, and Silco-Flex are Allis-Chalmers trademarks.

CHRYSLER KIMBERLY-CLARK GOODYEAR SOUTHERN CEMENT CONTINENTAL CAN AMERICAN OIL CELOTEX SCOTT PAPER HURON PORTLAND CEMENT FORD FIRESTONE PACIFIC GAS & ELECTRIC STANDARD OIL OF INDIANA B. F. GOODRICH DOW CHEMICAL MARLEY INGERSOLL-RAND LINK-BELT

WIDE ACCEPTANCE

of Super-Seal motors proves their advantages

Cement, petroleum, chemical, steel, mining, paper, utilities, municipalities and general industry — outstanding corporations in every field are specifying *Super-Seal* motors wherever operating conditions are tough.

Cost and *superior insulation* aren't the only reasons. Users are getting MORE MOTOR, too. Here's why:

Standard totally-enclosed motors, 55° C rise, have a *service factor of 1.* In other words, "nameplate" horsepower is the maximum. A 40° C rise *Super-Seal* motor with *Poxeal* insulation, and a 60° C rise *Super-Seal* motor with *Silco-Flex* insulation have a *service factor of 1.15.* For comparisons on what this difference means in required motor sizes, see this chart:

Rated Horsepower (Maximum Hp, TEFC)	Maximum Continuous Hp—*Super-Seal* Motor
15 hp	17.25 hp
25	28.75
40	46
75	86.25
125	143.75
200	230
350	402.5
500	575

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Pull-in torque.....

Pull-out torque.....

Application Data

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V-Belt ☐ Other:.....

Starting load.....

Ambient temperature.....

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Other.....

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(for comparison)

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Theory and Practice in Causticizing Green Liquor

Otto Sylwan
Canada Paper Co.,
Windsor Mills, P.Q. Canada

The article describes the search for optimum conditions for the causticizing process and endeavors to relate theoretical factors to the operation conditions of the causticizing plant of alkaline pulp mills. The progress of the causticizing reaction is described. The relationship between the chemical composition of the green liquor and its lime requirements for any given causticity is established. The conditions for complete utilization of the lime and recovery of the chemicals are stipulated and discussed.

According to the accepted usage in the kraft pulping, causticizing of green liquor is taken to mean more than the conversion of green liquor into white. The concept also includes the selection of types of limestone suitable for its purpose, arrangement of optimum calcination conditions for the limestone and, finally, complete utilization and recovery of the chemicals. The difference in the types of limestone or lime dealt with in this article is due to the differences in kinds and percentage of impurities in the limestone respectively the lime, the differences in size of the grains of the lime and, finally, the difference of the calcination conditions.

Progress of Causticizing Reaction

Generally, the causticizing reaction is represented as follows:

$$CaO + H_2O + Na_2CO_3 \rightleftarrows 2\ NaOH + CaCO_3$$

This representation is however incomplete; compositions such as $Na_2Ca\ (CO_3)_2 + 2\ H_2O$ and $Na_2Ca\ (CO_3)_2 + 5\ H_2O$ are isolated. Unfortunately, the conditions for the formation of compositions of this type and their chemical properties are known only to a very limited extent. It has been stated that they should be stable in cold solutions of high alkalinity. On the other hand, their stability in hot highly alkaline solutions may be considerable, otherwise it would be improbable that they could be found in the causticizing sludge. Very likely, compositions of this type are formed during the whole process. At the beginning, when the OH ion concentration is low, they decompose very quickly. At the end of the process, when the OH ion concentration has reached its maximum value, rendering their stability far greater, a considerable portion remains undecomposed. As these compositions contain alkali, they contribute to alkali losses with the sludge. For this reason it is of major importance that the methods used for testing of the sludge be such that the alkali from compounds of this type is included. In other words, the testing method should be performed in such a way that these components are decomposed.

The basic reason that the reaction progresses towards the formation of NaOH and $CaCO_3$ is the difference in solubility of $Ca(OH)_2$ and $CaCO_3$. According to information available (Handbook of Chemistry and Physics 1955-1956) the solubility of these compositions expressed in grams per liter of pure water are shown in Table 1.

The solubility drops with increasing temperature, whereas the solubility of calcium carbonate increases at elevated temperature. With regard to the solubility of the calcium carbonate, one item of great importance is that its solubility increases with increasing OH ion concentration. If 1.00 liter of a 2.00 N Na_2CO_3 solution reacts with the equivalent (56.00 gms) of lime under optimum conditions and the chemicals used are of reagent grade, the yield of the reaction is in the range of 82-83 per cent. Very likely, one of the main reasons for the incomplete reaction is the increased solubility of the calcium carbonate caused by the OH ions formed.

In this connection, the results obtained by Overwien and Linder are of interest. They have shown that the yield of the causticizing reaction drops with increasing OH ion concentration: If the solubility product of $Ca\ (OH)_2$ is taken as L_1 and of $CaCO_3$ as L_2 the following equations are obtained:

$$(Ca)\ (OH)^2 = L_1 \text{ and}$$
$$(Ca)\ (CO_3) = L_2$$

At equilibrium the concentration of the calcium ions is the same in both cases. Consequently:

$$\frac{(OH^2)}{(CO_3)} = L_1/L_2 = K \quad \text{or}$$

$$\frac{(OH)}{(CO_3)} = \frac{K}{(OH)} \quad \text{and}$$

$$\frac{(OH)}{(OH) + (CO_3)} = \frac{K}{K + (OH)}$$

As well-known, the causticizing reaction can be written as follows: $Na_2CO_3 + Ca(OH)_2 \rightleftarrows 2\ NaOH + CaCO_3$. In other words, in the sodium carbonate, the carbonate ion is replaced with the hydroxyl ion. Consequently, the fraction $\frac{(OH)}{(CO_3)}$ tells to what extent the carbonate ions are replaced with hydroxyl ions. Accordingly, this fraction is an indication of how far the reaction has progressed, or in other words, it measures the yield of the reaction. In accordance with the definition, the fraction $\frac{(OH)}{(OH) + (CO_3)}$ represents

TABLE I

	t°C	60	70	80	90
gms $Ca(OH)_2$/liter		1.16	1.06	0.94	0.85
	t°C	25	75		
gms $CaCO_3$/liter		0.015	0.019		

the causticity. As shown above, the fractions $\frac{(OH)}{(CO_3)}$ and $\frac{(OH)}{(OH)+(CO_3)}$ drop with increasing concentration of the hydroxyl ions.

As the solubility of calcium hydrate is low, the main part of it is present as the solid state. Consequently, the reaction between the Na_2CO_3 and the $Ca(OH)_2$ is taking place chiefly on the surface of the hydrate grains. Slaking of the burned lime means not only the transfer of CaO into $Ca(OH)_2$ and the development of heat, it also means in the phyisical sense the parting of the lumps into grains the size of which is predeterminated by the type of limestone used and the calcination conditions. At the start of the process, evidently the reaction takes place on the surface of the grains at which a layer of $CaCO_3$ is formed. Consequently, as the reaction progresses, the supply of the Na_2CO_3 and the removal of the NaOH has to take place by means of diffusion through a layer of $CaCO_3$ the thickness of which increases with the progress of the reaction. This theory explains why the reaction rate drops so considerably during the progress of the reaction and also the difficulty involved in the complete recovery of the last traces of unconverted lime.

In practice the capacity of the reaction tanks has to be limited. Consequently, the time available for the reaction is also limited. In order to obtain an acceptable causticity of the white liquor it is necessary that the demand for a reaction rate of sufficient magnitude is provided for. The simplest way to meet this demand is to increase the reaction area of the lime, or in other words, to use lime in excess. The quantity of lime required depends on the reactivity of the lime and the time available for the reaction. If a portion of the lime is on the bottom of the reaction tank as a precipitate, its "reactivity" is considerably decreased. Consequently, it is necessary to sufficiently arrange agitation so that the lime is uniformly distributed in the volume of the reaction tank. This is of great importance. Later, it will be shown that the smooth and stable operation and complete recovery of unconverted lime (that portion of the lime added which has not reacted) demands that a minimum of excess lime be used.

If a relationship between the composition of the green liquor and its lime requirements at any given causticity could be deduced, for instance from the results of a green liquor test, then a useful calculation of the quantity of lime required per volume unit of green liquor could be made. Thus not only a more stable operation but also improved operating economies would be achieved.

Analyzing Green Liquor

The concentration of the main components of the green liquor are determined as follows:

5 mls. of green liquor are titrated with 1.00 — N HCl against Bromphenol-blue Consumption A mls/ 5 mls. of green liquor.

10 mls. of green liquor are mixed with $BaCl_2$— solution in excess in a 100 ml. volumetric flask. The flask is filled up to the mark with distilled water, shaken and put aside for settling. When the main part of the precipitate has settled, the liquid is filtered through a filter paper of suitable retention such as Whatman's No. 42. The first drops running through are thrown away and 50 mls. of the filtrate are titrated with 1.00 — N HCl against Thymolphtalein. Consumption B mls./ 5 mls. of green liquor.

The titration is continued against Bromphenolblue. Consumption C mls./ 5 mls. of green liquor.

The results of the tests are represented in the following way:

$NaOH + Na_2S + Na_2CO_3$ = A mls. of 1.00 — N NCl per 5 mls. of green liquor

$NaOH + \frac{1}{2} Na_2S$ = B mls. of 100 — N HCl per 5 mls. of green liquor

$NaOH + Na_2S$ = C mls. of 1.00 — N HCl per 5 mls. of green liquor

Consequently, the concentrations of the main components of the green liquor expressed in terms of the test result are as follows:

$NaOH$ = 2B — C mls. of 1.00 — N HCl per 5 mls. of green liquor

Na_2S = 2(C — B) mls. of 1.00 — N HCl per 5 mls. of green liquor

Na_2CO_3 = A — C mls. of 1.00 — N HCl per 5 mls. of green liquor

The causticity is defined by the fraction $\frac{NaOH}{NaOH + Na_2CO_3}$; obviously, the concentrations of the components are expressed in the same component per volume unit of liquor, for instance NaOH, Na_2O or in this case for the sake of simplicity in mls. of 1.00—N HCl per 5 mls. of green liquor.

In order to obtain a certain causticity F, a portion of the Na_2CO_3 corresponding to x mls. of 1.00—N HCl per 5 mls. of green liquor has to be causticized. Consequently,

$$F = \frac{NaOH + x}{NaOH + x + Na_2CO_3 - x}$$

or:

$$F = \frac{NaOH + x}{NaOH + Na_2CO_3};$$

If the components are substituted with their concentrations obtained at the test of the green liquor, the equation takes the following form:

$$F = \frac{2B - C + x}{2B - C + A - C};$$

Consequently, $x = AF - 2B\,(1 - F) - C\,(2F - 1)$ mls. of 1.00 — N HCl/ 5 mls. of green liquor.

Evidently, based only on the results from the green liquor test it has been possible to build up a simple relationship betwen the composition of the green liquor and its requirement for lime for any given causticity. If F is assumed to be 0.8, corresponding to 80 percent causticity and the equation is transferred into practical units, the relationship takes the following form:

$x = 2.24\,(2A - B - 1.5C)$ kgms of lime per m^3 of green liquor.

Corrections. In order to get this quite theoretical relationship close to actual results, some corrections are necessary:

Lime Quality

In the relationship deduced above, the quantity of lime required is quoted in terms of lime with 100 percent causticizing power; as shown above, such a lime does not exist. For this reason a correction for the causticizing power of the lime actually used has to be made. If the causticizing power of the lime is assumed to be P percent, the relationship takes the following form:

$$x = 2.24 \frac{100}{P}\,(2A - B - 1.5C) \text{ kgms. of lime per } m^3 \text{ of green liquor.}$$

The causticizing power is determined in the following way:

1,000 mls. of a 2.00 — N Na_2CO_3 — solution are heated just to the boiling point and 56.00 gms. of lime crushed to pea-size pieces and sampled in such a way so it is representing the type of lime used, is added. After 60 minutes' slow boiling, the volume is adjusted back to 1,000 mls. and is put aside for settling and cooling. 5 mls. of the clear is titrated with 1.00—N

HCl against Bromphenolblue. Consumption D mls.

10 mls. of the solution are mixed with $BaCl_2$ solution in excess in a 100 ml. volumetric flask, which is filled up to the mark with distilled water. After settling of the main part of the precipitate the liquid is filtered through a paper filter of sufficient retention (Whatman's No. 42).

The first drops running through are titrated with 1.00 — N HCl against Bromphenolblue. Consumption E mls. Hence, the Causticizing Power P is

$$= \frac{E}{D} \cdot 100 \text{ percent.}$$

As the causticizing power is a new concept, it seems to be necessary to give some explanation of its use. As is to be understood from the description of the performance of the test, it resembles the causticizing reaction. Consequently, the causticizing power yields in a single simple figure the proper classification of types of lime used for the causticizing purpose. Something should be said about the "available lime test," which involves the titration of the lime with hydrochloric acid. As the impurities affecting the causticizing power have the nature of acids, the strong hydrochloric acid easily replaces them. For this reason a smaller or greater portion of the impurities are registered as lime. In any case it has been quite impossible to find a relationship between the causticizing power and the results obtained with the available lime test. On the other hand, experience has shown that the "causticizing power" yields useful figures, whereas the available lime test chiefly causes confusion.

The quantity of lime required per cubic meter of green liquor to obtain 80 percent causticity is determined as follows:

$$Q_t = \frac{2.24}{E/D} \cdot (2A - B - 1.5C) \text{ kgms.}$$

of lime per m^3 of green liquor.

The symbol Q_t means the quantity of lime required per volume unit of green liquor, according to the calculation based on the green liquor test.

Transferred into British units the relationship takes the following form:

$$Q_t = \frac{14}{E/D} \cdot (2A - B - 1.5C) \text{ lbs of}$$

lime per cu. ft. of green liquor.

In the relationship represented above, corrections for drop in causticizing yield caused by the components of the green liquor are not included. An investigation of this has given the following results:

A concentration of NaOH corresponding to 0.6 — N or less causes only a small reduction in the causticizing yield. A concentration of Na_2S corresponding to 2.5—N or less causes only a small reduction of the causticizing yield. A concentration of Na_2CO_3 corresponding to 3.0—N or less causes only a small reduction of the causticizing yield.

In this case only a small reduction means that the reaction yield changed from 94-98 percent to 92-96 range. Consequently, for a green liquor of normal composition no reduction of the lime quantity required for 80 percent causticity is needed.

The question as to whether this relationship is applicable in practice is justified. The complete answer can be formulated in the following way: The relationship deduced above is a quite theoretical one; corrections for the reactivity of the lime and reaction time available are not included. If the results obtained from this relationship is multiplied with an empirically found factor taking care of the reactivity of the lime and the limitations of the reaction time, this relationship can very successfully be applied. This empirical factor is found in the following way: from the green liquor pumped to the causticizing plant samples are taken. They are tested according to the method represented above and the quantity of lime required for the causticity desired, Q_t, is calculated. This quantity is added to the green liquor. The causticity of white liquor is determined. If, as is usually found, a lower figure for the causticity is obtained than is desired, the quantity of lime added is increased until the causticity desired is achieved. The lime quantity required for this causticity is assumed to be Qa. Hence, the impirical factor is Q_a/Q_t, or in words, the ratio of the lime quantity required for the causticity desired to the lime quantity obtained from the calculation based on the green liquor test.

Recovery of Unconverted Lime

As shown by the causticizing reaction represented above, causticizing of the sodium carbonate involves not only its transfer into sodium hydroxide; it also involves the conversion of the lime hydrate into carbonate. Consequently, the concept of "unconverted lime" means the portion of the lime added which has not been re-reacted. It was shown that causticizing yield drops with increasing hydroxyl ion concentration. Empirically, it is learned that one type of lime can cause a poorer causticizing yield than another with improved reactivity, provided that the concentration of the hydroxyl ions at completion of the reaction in both cases is the same. If the lime, as far as reactivity is concerned could be divided into fractions the most reactive fractions will react at first. Consequently, the unconverted lime remaining in the sludge after completion of the causticizing reaction consists of the fraction with the poorest reactivity. Further, the unconverted lime left after the completion of the reaction is located in the center of the grains, surrounded by calcium carbonate, consequently, the time needed for the diffusion through the layer of the calcium carbonate has to be considered. Finally, as shown above, the solubility of the lime hydrate $Cao(OH)_2$ decreases and the diffusion rate increases with elevated temperature, consequently each type of lime probably has its optimum temperature for recovery. The conditions for a complete recovery of the unconverted lime in the sludge are as follows: low alkalinity, sufficient duration of the reaction time and a temperature suitable for the type of lime used.

The requirement for low alkalinity needs some comment. The concentration of the hydroxyl ions controls the degree of recovery: with the proportioning if a large excess of lime to the green liquor, the quantity of unconverted lime remaining in the sludge is correspondingly large. The increase of hydroxyl ion concentration after the completion of the recovery process will also be large and, accordingly, the complete recovery of the unconverted lime is inhibited. Consequently, good lime economy necessitates the use of lime with high reactivity, it is also of course necessary to have the ratio of lime to green liquor under rigorous control.

Utilization Degree of Lime

As well-known, in broad outlines the causticizing reaction can be written as follows:

$$Ca(OH)_2 + Na_2CO_3 \rightleftarrows 2NaOH + CaCO_3$$

Consequently, the increase in concentration of NaOH indicates the utilization degree of the lime. On the other hand, an investigation has shown that the calculation of the utilization degree of the lime, based on the change in the NaOH concentration yields no reliable results, very likely due to the difficulty of exact determination of NaOH in solutions of this type. Further, a calculation of the utilization degree of the lime based on the change in Na_2CO_3 concentration yields reliable figures. The

calculation of the utilization degree of the lime is made in accordance to the following formula:

$$\eta = \frac{(A - C)_g - A_g \cdot \frac{(A - C)_w}{A_w}}{Q \cdot P} \cdot 3{,}495.9\%$$

where

$(A - C)_g$ is the concentration of Na_2CO_3 in the green liquor expressed in mls. of 1.00 — N NCl per 5 mls. of solution

$(A - C)_w$ is the concentration of Na_2CO_3 in the white liquor expressed in mls. of 1.00 — N NCl per 5 mls. of solution

A_g is the total alkali titre of the green liquor expressed in mls. of 1.00 — N NCl per 5 mls. of solution

A_w is the total alkali titre of the white liquor expressed in mls. of 1.00 — N NCl per 5 mls. of solution

Q is the quantity of lime added to the green liquor expressed in lbs per cu. ft.

P is the causticizing power of the lime used.

It has to be noted that the concepts and symbols used in the formula above are closely in accordance to those used earlier in this article. If the quantity of lime added is just equal to the requirement for lime of the green liquor or the causticity desired, in other words, no lime in excess, the formula takes the following form:

$$\eta = 1 - \frac{(A - C)_w}{(A - C)_g} \cdot \frac{A_g}{A_w} \quad 100\%$$

The formulae shown above are of general validity. When the quantity of lime added is equivalent to the requirements for lime or in excess, the interpretation of the results obtained is easy; if the green liquor is in excess, the case of recovery of unconverted lime, the interpretation is difficult. For this reason, the best check of the efficiency of the lime recovery process is the test of the sludge.

Causticizing Sludge Test

No doubt, the best way to check the operation in the causticizing plant is to test the lime, the green liquor, the white liquor, the weak white liquor and finally, the causticizing sludge. A lot of chemical tests have been tried for the sludge but yet none of them have yielded satisfactory results. One method tried includes the simultaneous determination of alkali as well as lime. The performance of this test is such that the alkali and the lime diffuse out into the aqueous liquid where they are determined by continuous neutralization with 0.1 — N HCl. At equilibrium the sum of alkali and lime is indicated by the amount of acid added. The lime quantity is determined by precipitation with oxalate and titration of the pure precipitate with 0.1 — n $KMnO_4$—solution in the conventional way.

It has been learned that tests on sludges from lime of high purity (95 percent $CaCO_3$ or more in the corresponding limestone) yield reliable figures. When the percentage of impurities increases, the reliability of the method declines and at a purity of the lime corresponding to a causticizing power of 60 to 65 percent the answers are quite misleading because of the impurities present.

Another item of importance is that if unconverted lime is present in the sludge it preferentially absorbs Na_2SO_4 and this affinity is so strong that it is quite impossible to wash the sodium sulphate out. The best way to determine the sodium sulphate completely is to dissolve the sludge remaining from the test in hydrochloric acid and to precipitate the sulphate ions in the conventional way.

The best method hitherto found is to determine the alkali by flame spectrophotometer in a solution prepared by the dissolving of the sludge directly into hydrochloric acid. The quantity of unconverted lime remaining in the sludge is also determined by the same apparatus; the Ca ions are determined from a solution obtained by "extraction" of the unconverted lime from the sludge with 0.1 — N HCl at minimum pH 8.5.

Selection of Limestone

As shown above, the supply of a type of lime suitable for its purpose is of major importance for optimum operation conditions and for the operation economy. Consequently, the selection of a suitable type of limestone and optimum performance of the calcination operation are of decisive importance.

The most common impurities in limestone are magnesia, iron, aluminia, silica and phosphorous. If more than 1.5 per cent magnesia is present in the lime very often wash difficulties occur due to the formation of the gelatinous $Mg(OH)_2$. Iron and aluminia are present as weak acids affecting the causticizing power of the burned lime.

During calcination the silica forms a cement with the lime. As the cement is of no value as causticizing agent, the silica causes losses. One way to inhibit the formation of the cement is to avoidance of too high a temperature in the kiln. Phosphorous is chiefly present as acids, thus affecting the causticizing power of the lime.

Causticizing Reaction

A relationship between the concentration of the total alkali in the green liquor, the reactivity of the lime supplied, the reaction time and the causticity of the white liquor obtained exists. At the same reaction time the reactivity of the lime and the total alkali in the green liquor follow each other. This means that the lower the reactivity of the lime is, the lower the total alkali in the green liquor should be for a proper causticity and a good lime economy.

As well known, the sulphidity of the green liquor influences the lime requirements in such a way that the higher the sulphidity is, the lower is the lime requirement. This is made clear in the relationship between the composition of the green liquor and its requirement for lime shown earlier.

With regard to the agitation time or effective retention time in the reaction tanks it has been learned that if the lime is agitated too much it becomes "slimy" and it is difficult to carry through a complete wash on the filters. Due to this slimy structure of sludge, water penetration becomes poor and, consequently, the filter wash efficiency drops. The optimum agitation time seems to be different for different types of lime.

Recovery of Lime and Alkali

A sludge free from unconverted lime is much more porous and, consequently, much easier to wash free from alkali than a sludge containing unreacted lime. Accordingly, the main condition for the complete recovery of the alkali is to provide for an entire recovery of the unreacted lime remaining in the sludge.

One important item common to batch and continuous systems is the problem of getting clear white liquor from the white liquor storage tanks. As a matter of fact, the causticizing reaction is not finished when the white liquor leaves the causticizing plant, the white liquor is saturated with lime and further, as shown above, the solubility of the calcium carbonate decreases at lowered temperature. As heat losses from the white liquor storage tank are unavoidable, the temperature of the white liquor in the storage tank

drops. This means that the stored white liquor always will yield a precipitate of calcium carbonate and the bottom of the white liquor storage tanks are always covered with sludge. As this sludge entrained in the pulp causes serious troubles, it has to be avoided.

Settling Sludge Rate

In order to save heat and chemicals contaminated condensate from the evaporators is used in the causticizing plant. Fundamentally, the settling rate of the sludge depends on the ratio of weight of the grains to the surface area of them, the cleanliness of the water and its viscosity which naturally depends on the temperature. With regard the size of the grains, this item has been discussed above; the temperature of the water has to be as high as possible. On water cleanliness, the following statements can be made: at the evaporators there is always risks of black liquor carry-over. Consequently, sometimes the condensate originating from the black liquor becomes more or less contaminated.

The soap in the black liquor forms compositions with the lime. The density of these compositions is of the same order as that of water. Consequently, these "limesoaps" have a very poor settling property and accordingly, they cause serious troubles in the operation of the causticizing plant.

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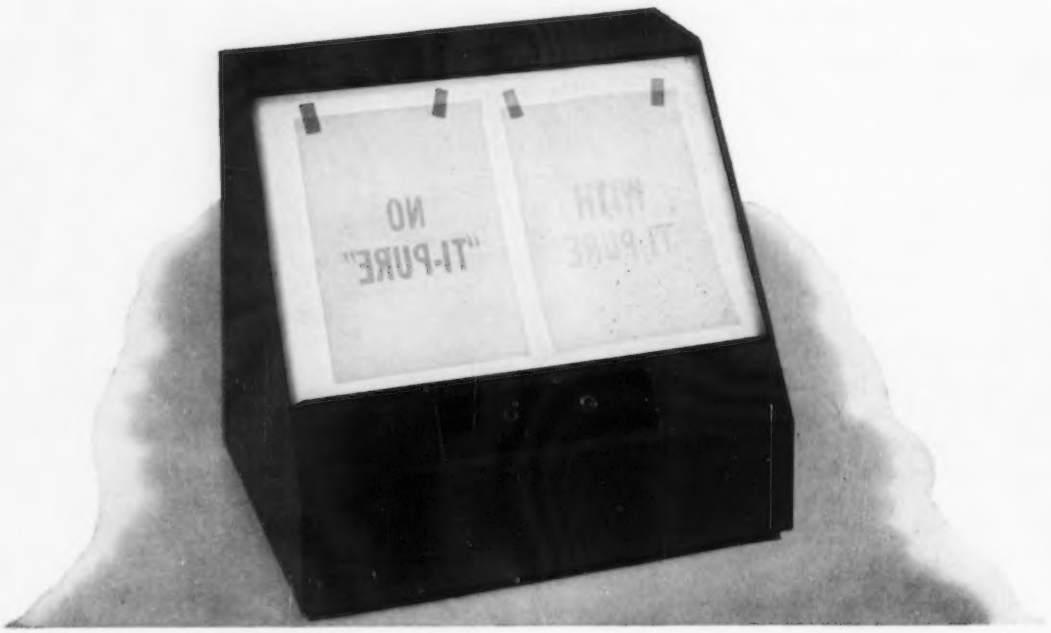
Lockwood Trade Journal Co. **49 West 45th Street** **New York 36, N. Y.**

overcome show-through



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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

. . . from Du Pont

Swedish Mill Uses Wet Web Strength as Routine Control Method

The initial wet strength of pulp has proved of value at this mill in establishing a routine method for controlling pulp quality and paper machine operation.

The initial wet strength of paper pulp has been discussed in detail in recent years in the trade literature. Statements on the application to routine control are, however, sparse. One finds very little on the connection between the wet strength of the pulp and the wet sheet performance on the paper machine. The reason is that the running of a paper machine is influenced by a multitude of factors.

With mixed furnishes (for example newsprint furnish) the percentage of the different pulps as well as their individual properties together with the magnitude of the fine fraction in the white water which depends on the retention on the wire, all have influence. The wire retention itself is influenced by the pulp temperature, pH, percentage air, concentration of aluminum ion, and percentage of colloidal particles.

All these factors vary more or less irregularly, so that one can hardly entertain strong hopes of showing a clear connection between, for example, machine operation and pulp wet web strength. If one has detailed break statistics at one's disposal, where every break is logged with the most careful information possible as to the particular break duration and causes, then the situation is a little more favorable.

Breaks Related to Wet Strength

When the frequency of typical breaks is plotted against wet strength and web stretch on a time diagram, one finds a connection between the three variables sometimes indistinct but occasionally fully discernible in longer periods.

In the running of news machines, one finds normally that one is compelled to run with considerable draw between couch and first press at the risk of more breaks. In this case, the sheets stress strain properties are obviously important. In such a situation, a break in the sheet often results.

If the situation is such that pulp quality cannot be further improved through measures in the groundwood mill, the possibility remains for the paper mill personnel to compensate for the deterioration through changes in pulp mixing or through other measures. If such measures are to be taken in time, it is necessary that the information on quality changes reaches the paper mill with time to spare. Wet strength measurements have been utilized for this purpose at one European mill.

Initial Wet Strength Tests At Hallsta Mill

In order to obtain a more complete picture of pulp properties wet strength measurements have been applied for several years as a routine control method at the Hallsta mill in Sweden where the new method and apparatus were developed. Generally, control of groundwood qualities is established through observation of paper mill performance and through freeness measurement with occasional fiber fractionation and strength testing on dry sheets, and also by use of the blue glass. The new method involves the measurement of breaking stretch and breaking load, and recently the measurement of dewatering time of test sheets has been added. By degrees these wet strength measurements have taken hold, while some of the standard tests have lost significance and in some cases have been abandoned.

The method has been applied on a full scale investingation on a Reisten refiner and gave a significantly clear picture of the beating properties of the refiner which would not have been obtained without the application of these measurements. The method has also been used, in an extended form, for an investigation of the influence of sulphite pulp properties on groundwood sulphite

Excerpts from a translation of an article by Uddo Ullman of Holmens Bruks Aktiebolag, Hallsta Pappersbruk, Sweden. Published in Svensk Papperstidning July 31, 1958.

mixtures. In particular, this method has been used in experimentation on a new method of impregnating the chips in the sulphite digesters and for the development of high yield cooking of news sulphite. The results obtained were subsequently substantiated by experience in the paper mill. It has also become obvious how the beating of chemical pulps to a considerable degree affects the wet strength properties. This influence is so strong that the properties can be used to characterize the beating resistance of the pulps.

For newspaper operation, the greatest interest is centered on the properties of mixtures of newsprint and sulphite pulps with the sulphite percentage for normal running around 15 per cent.

It can be established from a pulp's wet strength in the unmixed and unbeaten state, that no conclusions can be drawn as to how the pulp will influence the final properties of the mixture in which it shall be included. One is, therefore, forced to test a pulp under the conditions and in the state in which it will be used.

Forming the Test Sheet

To obtain the lowest spread of measurements and to give reproducible measurements as rapidly as possible, a special sheet forming procedure was developed. The method was designed to meet the following conditions:-

(1) The test strip shall be obtained with the minimum of work.

(2) The strips shall have suitable dryness.

(3) The strips shall be exposed to the minimum amount of manipulation.

The sheet former is supplied with arrangements for holding a constant vacuum under the wire, and with a frame that lies on the topside of the wire so that the desired number of test strips are produced. By means of the passage of air through the sheet for a suitable time and with suitable vacuum, the desired sheet dryness is obtained. After this, the wire is removed from the sheet former. Using a suitably constructed pair of tweezers, the strips are removed by hand from the wire, set in the instrument and tested. The freeing of the sheet from the wire and the fastening of the strip in the instrument are the methods only sensitive factors. These must be done with judgment and caution.

Test Instrument

The instrument and the associated measurement process are not claimed as capable of laboratory like scientific precision. The work was entirely directed towards the designing of an instrument and a method with the greatest simplicity in handling and suitability for a routine control method.

The instrument consists of a balance arm of which one end is balanced by an arrangement giving the stretch. The other end supports a clamp in which one end of the test strip is fastened. The other end of the test strip is fastened in a second clamp held in a screw which moves in a nut. When measuring, the nut is rotated at a constant speed with a motor so that the clamps are separated and the strip is stretched. The tension in the test strip is balanced below by the thread of the stretch recording element and is recorded continually by this on an electronic recorder. Because the trace is at a constant speed, the length axis of the record will be proportional to the stretch. Thus, a stress strain diagram is obtained.

It has been found suitable when repeatedly testing the same pulp to put back the chart so that all curves start from the same point. This can be carried out either manually or automatically. This system has the advantage that one does not have to note down the individual results nor to calculate their average. With the assumption that the strips have the same basis weight and dry content, one only needs to look for the median value of the breaking load and breaking stretch and note these. The calculation of results can be carried out in situ, then the diagram is removed.

The instrument was constructed so that it was robust and easy to handle, and in spite of the fact that the instrument was intended as a routine control instrument, the accuracy of measurement is so good that the spread of results is dependent to a greater extent on the spread of properties of the test samples.

"In spite of the fact that the instrument was intended as a routine control instrument, the accuracy of measurement is so good that the spread of results is largely dependent on the spread of properties of the test samples."

Correction Factors

After the strips are tested, they are weighed before and after drying and the weight and percentage dryness determined. By means of this figure the measured break value is corrected to a calculated initial wet strength which the sheet should have had with a standard weight and percentage dryness.

The corrections are based on the experience that the wet strength is directly proportional to the sheet weight and percentage dryness.

A correction diagram was used for a short time. Percentage dryness and wet strength curves were approximated to give a straight line through the origin. The divergence from actuality was judged so little that it could be neglected in comparison with the spread of the measurements. In connection with this correction diagram, a dry content of 20 per cent had been applied because this was in the range of couch dryness. Later 25 per cent was subsequently chosen as the normal percentage dryness. Although this percentage dryness is more nearly that at the first press than at the couch, it can be considered to be as well warranted as to choose the couching moisture at the normal value. It is known that the break in percentage dryness curves for different pulps are tolerably uniform and that as a rule in the region of 25 per cent to 35 per cent dry can be approximated to a straight line through the origin. At the higher weights, this approximation makes possible a more simple correction procedure wherein the correction is made by carrying out the proportion on a slide rule.

The weight derivatives are corrected in the same manner. Even this method can be approximated by assuming that the wet strength vs. basis weight curves go through the origin. At weights around 100 gm./m.^{2} this approximation is much less than the spread of the experimental results.

"Initial wet strength measurements applied to full scale investigation on a refiner gave a significantly clear picture of the beating properties of the refiner which would not have been obtained without the application of these measurements."

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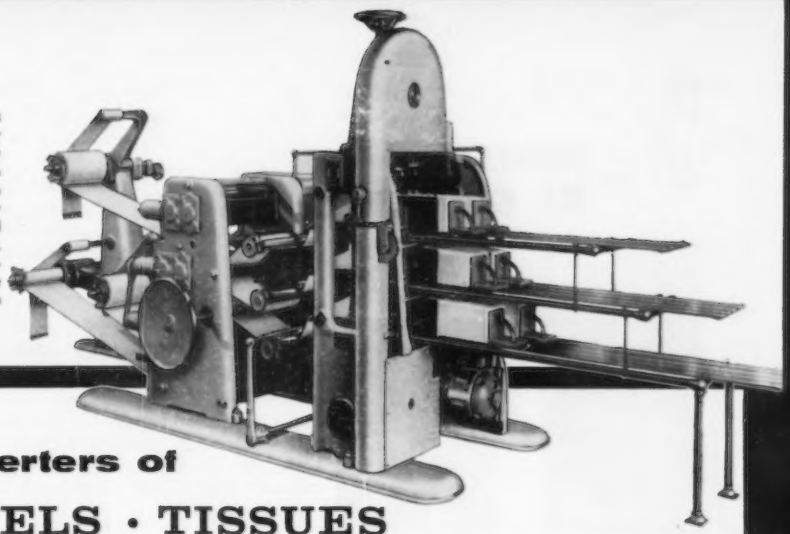
Pacemaker for the industry, this machine produces regular or facial quality napkins (and other paper or cellulose products) of all standard sizes in perfectly folded squares. Rotary in operation, it handles one to four parent rolls simultaneously and produces up to 2400 completed printed and embossed napkins per minute! Multi-color oil or flexographic ink printing and embossing units can be furnished or added as required. Heavy duty construction, high production speed, dependability, low original cost plus low maintenance expense makes this machine the most popular napkin producer in the industry.



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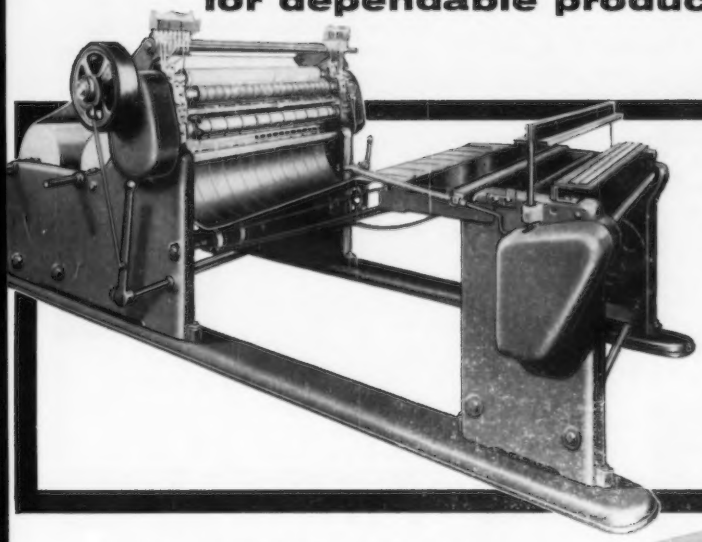

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Production of single or double-ply interfolded toilet tissues in single or multiple folds reaches unprecedented new highs with this modern Hudson Sharp machine. Sturdily constructed and completely rotary in operation it carries paper from parent rolls through feed rolls, into folding cylinders, and continuously delivers a product of exact sheet count to the packaging unit. Equipped with a semi-automatic banding unit, one operator easily handles the machine's entire output. Embossing units can be added if desired.

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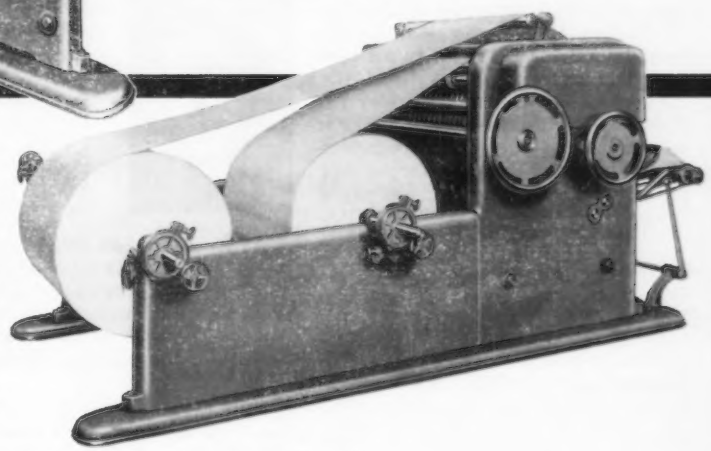
Designed to produce interfolded towels in any standard size, this machine produces from 10 to 12 cases, per towel width, per hour! Completely rotary in operation, all necessary adjustments are simple to make and easily accessible. Furnished in any widths up to 60" in all standard sizes and folds. Besides towels, this machine is practically adaptable for interfolding wax papers, glassines, butcher wraps, delicatessen papers and others. Write for complete information on any of these popular Hudson Sharp machines that are continuously increasing converting production throughout the industry.



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PJT NEWS OF SUPPLIERS

C. E. Green

J. W. Thompson

B. L. Montague Co., Inc., of Sumter, South Carolina, opens a new conveyor sales division at Greenville, S. C., with Curtis E. Green, director of conveyor sales and John W. Thompson, chief conveyor engineer.

L. D. Montague, president and general manager of the B. L. Montague Co., announced the opening of the new conveyor sales and engineering division.

Mr. Green, was formerly the manager of the materials handling department of J. E. Sirrine Co.

Mr. Thompson was chief engineer for the Jervis B. Webb Co., of Georgia, and has been an engineer in the material handling field for the past 13 years, specializing in Conveyor Systems.

Lestoil Inc. Martin Davis has been appointed manager of all sales of d-i Lestoil to paper mills by the Industrial Sales Division. In his new position, Mr. Davis will direct the sales of d-i Lestoil to the paper industry. He will be available for consultation with paper manufacturers in the use of d-i Lestoil for solving problems in the manufacture of paper products.

National Starch Products Inc., and **American Maize-Products Co.,** co-venturers in the project, announced the development in research quantities of a new type of corn with extraordinary possibilities in the production of new types of starches with application in many industries. Preliminary research estimates of application of starch manufactured from the new corn, known as amylomaize, indicate the following possibilities in the near future:

1. Use in water soluble transparent film wrapping material for frozen foods, meats and other edible products. Meals may be cooked without removing the wrappings, since the amylomaize wrapping materials will dissolve in the cooking utensils. Since the film is made from corn, it becomes completely digestible when dissolved.

2. Use as a packaging material for water-dispersible products such as detergents, dyes, insecticides and industrial chemicals as replacement for the more expensive water-soluble synthetic films now used.

3. Use in non-water-soluble types for the coating and surface treatment of paper and paper products.

Monsanto Chemical Co. has begun construction of a new plant for the manufacture or Mersize.

It is the second new plant for this product to be announced under construction by Monsanto within the past month. A similar unit is being built by the company at Seattle, Wash., to service the Northwest's rapidly growing paper industry.

The combined capacity of the two new plants will be a major increase in the company's production capacity for Mersize. It is now produced at Baxley, Ga., and Montreal, Canada.

R. B. Aufmuth

H. K. Ferguson Co., announced the appointment of Raymond B. Aufmuth, as chief engineer. In his new position, Mr. Aufmuth will direct and coordinate all engineering activities of Ferguson's world-wide operations.

An 11-year Ferguson veteran, Mr. Aufmuth's most recent assignment was that of staff engineer in the company's main office in Cleveland, engaged in furthering the expansion of the firm's design and construction activities in the steel industry. He joined Ferguson in 1947.

Appleton Machine Co., Appleton, Wis., announces the promotion of three executives. They are Victor W. Bloomer, chairman of the board; Tany Agronin, president; John M. MacDonald, Jr., vice president. The appointments were made during the firm's annual meeting of its board of directors and become effective the first of the year.

Eaton Manufacturing Co., and **Cleveland Worm & Gear Co.,** at separate meetings, approved a transaction whereby Eaton will acquire the assets and business of Cleveland Worm & Gear and its wholly-owned subsidiary, the Farval Corp.

An announcement by John C. Virden, chairman and president of Eaton, and Howard Dingle, chairman of Cleveland Worm & Gear, said that following approval by shareholders of the latter company at a meeting in January, a total of 81,670 shares of Eaton's capital stock would be exchanged on a share for share basis for an equal number of Cleveland Worm & Gear shares currently outstanding.

R. W. Olmstead

H. K. Ferguson Co. Elevation of Ralph W. Olmstead to the position of president has been announced by board chairman J. B. Bonny. In other action taken by the board of directors, the retiring president, Wells N. Thompson, was elected vice-chairman of the board.

Mr. Olmstead, had been named executive vice-president of the Ferguson Co. early in 1958. He joined Ferguson in 1954 as assistant to the president, and was elected a director of the company in 1956.

Mr. Thompson, who has headed the organization since 1955, has been with the company since 1921.

Hamlin & Morrison, analytical and consulting chemists, 216 S. Second St., Philadelphia, has been acquired by P. L. Morrison, who is the third generation of his family to be connected with the company. Hamlin & Morrison will specialize in moisture testing of market pulp.

E. D. Jones Corp., Pittsfield, Mass. paper machinery manufacturing firm, will construct a new plant on approximately 100 acres of land currently owned by Crane Co., of Dalton, Mass.

Announced by A. A. Neese vice-president of Beloit, was the appointment of Donald W. Curtis of Beloit as assistant to the president of the E. D. Jones Corp.

C. C. Hendricks

Bauer Bros. Co., Springfield, Ohio, has announced the addition of Crockett Carl Hendricks to its southern sales division. Mr. Hendricks has wide experience in the pulp and paper industry. He was formerly with Albany Felt Co.

Mr. Hendricks will make his headquarters at 211 W. Main Street, Brevard, North Carolina.

Allis-Chalmers International. Appointment of D. A. Wooley as manager of its London office has been announced.

Mr. Wooley has been with Allis-Chalmers since 1949 and was assigned as a sales representative to the New York district in 1951. Prior to being named to his new post, he was manager of petroleum and chemical sales in the New York district.

Mr. Wooley is a mechanical engineering graduate of the University of Michigan and a member of the American Society of Mechanical Engineers.

In London, he succeeds Donald C. Altman who was recently promoted to assistant managing director of Allis-Chalmers Great Britain Ltd.

Dow Chemical Co. will open a sales office in Charlotte, North Carolina, February 2. The new office will be the 19th in important cities throughout the country.

T. H. Caldwell, Jr., has been appointed manager of the office, moving up from his former post as manager of automotive chemicals sales. His appointment was announced by Donald K. Ballman, director of sales.

Joseph T. Ryerson & Son, Inc. announced the following new appointments at its Cincinnati steel service plant.

Albert H. Bader, former manager of the general order department, was appointed assistant to the general manager, with special responsibilities as assigned by Earl R. Nelson, general manager. Norman R. Miller, former manager of the work order department, was named manager of the general order department and merchandise procurement departments. Succeeding Mr. Miller as manager of the work order department is Theodore G. Mates, who was a sales representative for the Ryerson plant in Pittsburgh. Louis G. Brinker of the procurement and merchandise department was appointed supervisor of merchandise records.

J. Cameron Brown, Jr.

Improved Machinery Inc., Nashua, N. H. announces the appointment of J. Cameron Brown, Jr. as sales representative for Connecticut, Rhode Island, Central and Western Massachusetts, Southern New York, Eastern Pennsylvania, New Jersey and Delaware.

Mr. Brown, a graduate of Rensselaer Polytechnic Institute has been an Impco sales engineer for four years. His home is in Hollis, N. H.

T. H. Scanlon

Rust Engineering Co. has named Thomas H. Scanlon project manager, he will also be in charge of the Oxford Paper Co. contract for a new kraft pulp mill at Rumford, Maine. Mr. Scanlon was transferred from Rust's engineering department where he has been a staff and project engineer specializing in paper mill design and construction. His headquarters remain in Pittsburgh. He joined Rust in 1950 as a project engineer with previous construction experience in the paper industry.

Mr. Scanlon is a member of the National Society of Professional Engineers.

J. H. Austin

Black-Clawson Co., Paper Machine Division, Watertown, N. Y. James H. Austin, project engineer moved recently to Brazil where he is serving as chief enginer for Companhia Federal de Fundicao in Rio de Janeiro.

Companhia Federal de Fundicao is the licensed manufacturer of Black-Clawson pulp and paper mill equipment for the South American market. The firm employs 400 people and includes a foundry, machine shop, engineering department and sales organization.

Albany Felt Co. The appointment of Perry H. Brown as director of Quality Control at the Albany, New York plant was announced.

Mr. Brown is a 1955 graduate of Lowell Technological Institute, where he earned both his bachelor's and master's degrees in Textile Engineering. Prior to his new assignment, he spent three years with the Design, Manufacturing and Quality Control Departments at the company's main plant in Albany, N. Y.

Borden Chemical Co. appointment of Harry C. Wechsler as a vice president effective January 1, 1959, has been announced by A. R. Marusi, president.

In his new position, Mr. Wechsler will be responsible for development of various plastic projects. He will retain his present responsibilities as general manager of Borden's polyvinyl chloride department, which is headquartered in Leominster, Mass.

Mr. Wechsler, who received a Ph.D. in high polymer chemistry from Brooklyn Polytechnic Institute, joined Borden's in February, 1955. He established the polyvinyl chloride department and directed construction of the company's first PVC manufacturing plant, which opened in Leominster in 1956.

PULP AND PAPER MILL INSTRUMENTATION

by E. J. Cole & M. Todd, appendix by R. B. Lundy

This is the first book ever published which exclusively deals with automatic control, measurement, and other forms of instrumentation as specifically applied to pulp and paper processes. Price $3.50.

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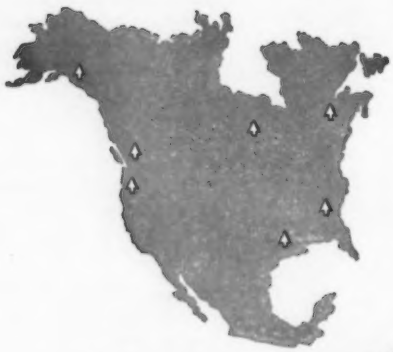

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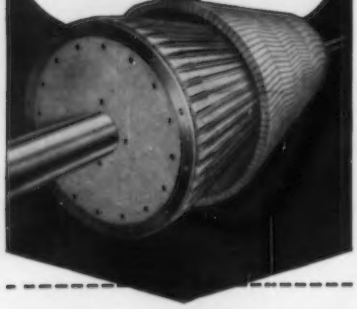

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This revolutionary advance, exclusive with Jones, not only holds bars more securely, reduces slot wear and corrosion, but also cuts hours from the job of stripping and filling.

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Jones FULBAR SHELL FILLINGS

Fulbar Shell Fillings eliminate keys and wedges. One piece construction fits shell body of any Jordan, simplifies handling, cuts installation time. And the patented No-wave pattern — also exclusive with Jones — has no sharp bar-ends to form strings or lumps.

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Kraft, Blchd.	157.00/ —	160.00/162.50	$157.00/162.50*		$157.50/ —
Kraft, Blchd. Hdwd.	152.00/ —		$137.00/ —		
Kraft, Semi-bleached	140.00/ —	140.00/ —			
Kraft, Unbl.	117.50/125.00	125.00/130.00	†125.00/130.00	125.00/ —	
Sulphite, Blchd.	155.00/ —	155.00/ —	*155.00/ —	*155.00/ —	155.00/ —
Sulphite, Bl. Hdwd.	150.00/ —				
Sulphite, Unblchd	135.00/ —	135.00/ —	†135.00/ —	*135.00/ —	
Sulphite, Unb'l. Gl'sn		134.00/ —	†134.00/ —		
Soda, Blchd.	147.00/150.00	150.00/ —			

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WEEK ENDED DEC. 30

	Atlanta	Memphis	Dallas	Los Angeles
Grade 1	n.a.	n.a.	n.a.	n.a.
2	n.a.	n.a.	$8.75/7.50	7.50/7.25
3	$8.00/7.00	$7.00/6.50	7.25/6.75	7.00/6.75
4	7.00/5.75	6.00/5.75	6.25/5.75	6.25/5.75
5	5.75/5.00	5.25/5.00	5.50/5.00	5.50/5.00
6	5.00/4.00	4.50/4.25	4.50/4.25	4.25/3.75
7	4.00/3.00	3.50/3.25	4.00/3.00	2.50/2.00

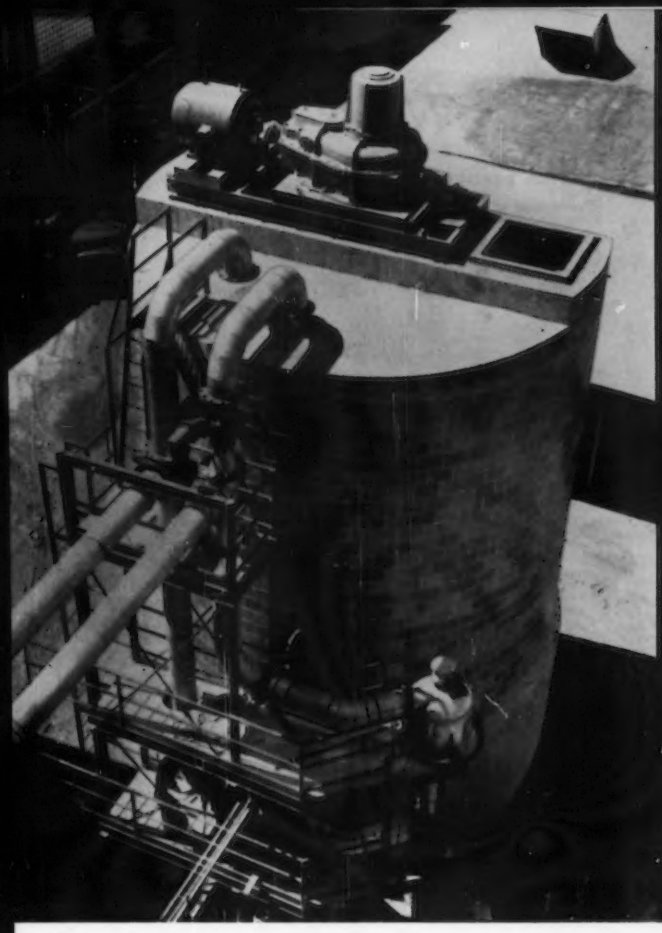
WASTE PAPER MARKET

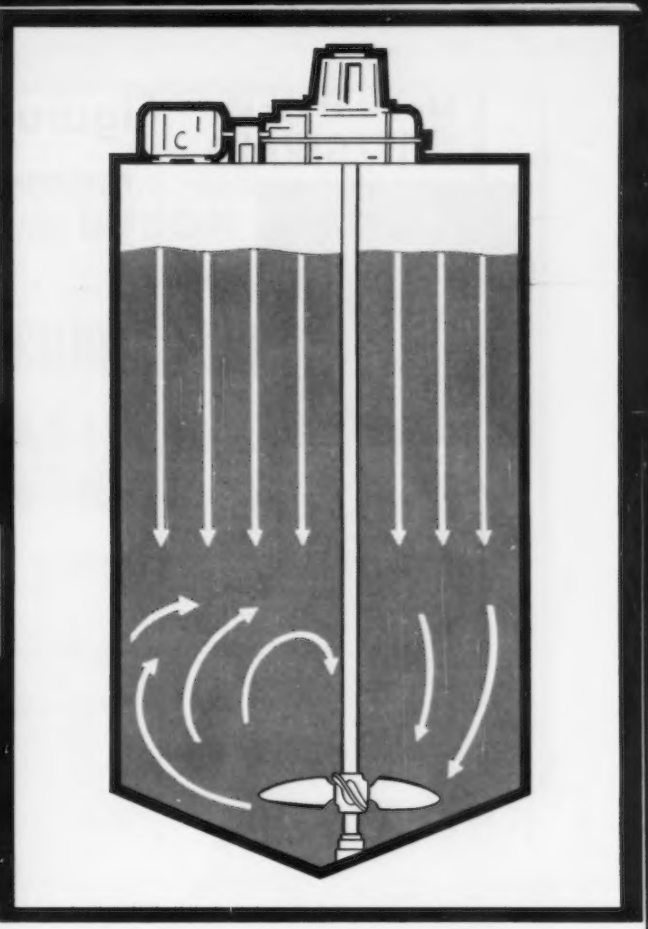
Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers and brokers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	Jan. 5	Jan. 5	Jan.	Jan.
No. 1 Mixed Paper	$10.00/ 11.00	8.00/ 10.00	9.00/ —	14.00/ 15.00
No. 1 News	17.00/ 18.00	16.00/ 18.00	25.00/ —	17.00/ 18.00
Overissue News (Lg. size)	16.00/ 18.00	12.00/ 14.00	25.00/ —	20.00/ 22.00
Mill Wrappers	19.00/ 22.00	13.00/ 15.00	30.00/ —	15.00/ —
Old Corrugated Containers	24.00/ 25.00	23.50/ 24.00	25.00/ —	25.00/ —
Super Resorted Kraft Paper	35.00/ 40.00	35.00/ 40.00	35.00/ —	55.00/ 57.50
New Double Kr. Ld. Corr. Cuts	35.00/ 37.50	37.50/ —	37.50/ —	35.00/ 37.00
(Semi-chem. medium)	47.50/ 50.00	45.00/ 50.00	45.00/ 50.00	35.00/ 36.00
New 100% Kraft Corr. Cuts	40.00/ 42.50	50.00/ 55.00	57.50/ —	— / —
New Br. Kraft, Env. Cuts	70.00/ 75.00	70.00/ 75.00	52.50/ —	55.00/ 57.00
New Br. Kr. Bag Waste Prntd.	55.00/ 60.00	55.00/ 60.00	52.50/ —	55.00/ 58.00
New Br. Kr. Bag Waste Unprintd	60.00/ 65.00	65.00/ 75.00	62.50/ —	58.00/ 60.00
No. 1 Groundwood Shvs.	25.00/ 30.00	22.50/ 27.50	27.00/ —	30.00/ 37.50
White Newsblanks	60.00/ 65.00	50.00/ 57.50	45.00/ —	55.00/ —
No. 1 Soft White Shvs.	60.00/ 65.00	60.00/ 65.00	55.00/ —	67.00/ 70.00
Super Soft White Shvs.	65.00/ 75.00	75.00/ 85.00	65.00/ —	— / —
Hd. White Shvs.	90.00/ 95.00	95.00/105.00	85.00/ —	95.00/ 97.00
Hd. White Env. Cuts	105.00/110.00	110.00/115.00	90.00/ —	113.00/ —
Col. Tab. Cards	50.00/ 60.00	55.00/ 60.00	52.50/ —	38.00/ 40.00
Manila Tab. Cards	75.00/ 80.00	75.00/ 80.00	75.00/ —	65.00/ —
No. 1 Col. Ledger	32.50/ 37.50	25.00/ 30.00	45.00/ —	29.00/ 30.00
White Ledger	60.00/ 62.50	57.50/ 62.50	57.50/ —	50.00/ 55.00
Mixed Book & Mag.†	20.00/ 23.00	18.00/ 20.00	14.50/ —	— / —
No. 1 Books‡	25.00/ 30.00	20.00/ 22.00	32.50/ —	16.00/ —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.





How to spot a stock fluctuation before it happens

Engineers have found a fast, sure new way to get stock ready for its trip through St. Regis Paper Company's big mill at Pensacola, Fla.

Heavy stock—averaging 6%—moves out of this storage chest at a consistency that's uniform and *known in advance.*

There are no sudden up-and-down swings. Feed stock fluctuations that occur are smoothed out—end result is a fully predictable effluent. Thus it's easier for mill engineers to control the entire highly automated circuit through which the stock flows on its way to the machine.

How does it work? Sitting on top of the chest is a LIGHTNIN Mixer that develops 200 horsepower. A steel shaft reaches 28 feet down into the chest's cone bottom, where a fast-turning 8-foot diameter propeller gives the heavy stock a powerful churning.

Mixing takes place in a sharply-defined zone in the bottom third of the unbaffled chest. Within this controlled zone, stock is fully uniform. Above the agitated zone, stock is relatively motionless, but it moves in a definite plug-like flow into the agitated zone as mixed stock is drawn off. Time cycle and flow path of all stock—mixed and unmixed—are completely predictable.

How you can apply it. Wherever you want uniform stock to help your mill system run efficiently, you can get it with LIGHTNIN Mixers in your chests or tanks.

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To get the facts on this tight-control stock mixing method, now working effectively in more than 100 mills, call in your LIGHTNIN Mixer representative (listed in Thomas' Register). Or write us today.

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☐ Top entering; propeller types: ¼ to 3 HP (B-103)

☐ Side entering: 1 to 25 HP (B-104)

☐ Portable: ⅛ to 3 HP (B-108)

☐ Condensed catalog showing all types (B-109)

☐ Quick-change rotary mechanical seals for pressure and vacuum mixing (B-111)

☐ Data sheet for figuring general mixer requirements (B-107)

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Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

1958	Nov. 29 86.5	Dec. 6 92.7	Dec. 13 90.6	Dec. 20 92.4r	Dec. 27 51.8
1957	Nov. 30 87.0	Dec. 7 91.1	Dec. 14 91.3	Dec. 21 92.0	Dec. 28 49.4

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1958	86.9	89.5	89.5	88.4	86.4‡	86.2‡	76.0‡	89.8‡	86.7‡	91.4‡	90.3‡	—	—
1957	94.2	97.0	97.1	94.0	94.6	93.3	75.6	90.7	86.0	93.0	90.7	81.5	90.9

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1951	1952	1953	1954	1955	1956	1957	1958
Year to Date	99.6	90.7	93.7	92.3	95.9	98.5	91.1	87.0
Year Average	98.0	88.6	92.3	91.6	94.0	97.9	90.9	

All of the above data is based on tonnage reported to American Paper and Pulp Association, Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn. Figures

COMPARATIVE WEEKLY SUMMARIES

1958	Nov. 29 88	Dec. 6 84	Dec. 13 94	Dec. 20 91	Dec. 31 N.A.
1957	Nov. 30 86	Dec. 7 84	Dec. 14 92	Dec. 21 93	Dec. 31 45

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1958	80	86	88	84	84	86	76	93	90	95	92	—	—
1957	91	94	94	92	93	91	72	94	91	97	92	79	90

† *Percents of operation based on "Inch-Hours" reported on a 6-day basis.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	THIS WEEK ENDING Dec. 20, 1958	LAST WEEK ENDING Dec. 13, 1958	CUMULATIVE TO DATE Jan. 1 to Dec. 20, 1958
TOTAL	295,919	309,537	13,955,786
Liner	95,120	107,941	4,698,417
Corrugating Material	45,783	46,994	2,115,318
Chip & Filler Board	5,110	5,383	244,582
Total Containerboard	146,013	160,318	7,058,317
Folding	57,328	56,134	2,640,975
Set-up	10,375	10,306	554,118
Special Food Board	28,333	28,705	1,286,205
Other	53,870	54,074	2,416,171
Total Boxboard	149,906	149,219	6,897,469
TOTAL ORDERS			
Received	255,176	275,370	
Unfilled End of Week	364,444	403,401	

WHY COOK STARCH

THE OLD HIT OR MISS METHOD—CUT DOWN WASTE AND LEARN WHAT PRESSURE COOKED STARCHES CAN DO FOR PRODUCT CONTROL AND

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OBITUARIES

A. Russell Maroney, sales representative of The Northwest Paper Co., died December 11th; he had been with the company since 1936.

Clarence L. Durkee, 58, died in his sleep on January 7 at the Shawnee Hotel in Springfield, Ohio. Mr. Durkee was employed by Bauer Bros., in the design and sale of a continuous digester. Previous to this he was associated with D. J. Murray Manufacturing Co., Wausau, Wis.

PJT NEW LITERATURE

Eimco-Process Clarifiers and Oxidators

Describes the basic types that cover a full range of tank sizes and load requirements, and special units for unusual conditions. Gives comprehensive information on vertical shaft, center column and traction mechanisms, as well as two design innovations pioneered by Eimco-Process. Bulletin SM-1005. Process Engineers, Inc., 420 Peninsular Ave., San Mateo, Calif.

Iron Fireman Pneumatic Spreader Stoker

Liberally illustrated with cutaway views, installation photographs and diagrams, this booklet gives detailed information on the Series 401 pneumatic spreader coal stokers. Booklet 2530. Iron Fireman Mfg. Co., 3170 West 106th St., Cleveland 11, Ohio.

Monel, Nickel Valves

Broadly defines the applications of cast Monel and Nickel valves to corrosive environment and describes their respective areas of usefulness. Bulletin 9. Alloy Steel Products Co., Inc., Linden, N. J.

O & S Fuel Burning System

Lists 11 sizes of oil, gas and combination gas and oil burners for firing boilers or other heat exchange equipment. Also discusses the principles of operation and application engineering and service handled by representatives in major cities. Bulletin 1255. Orr & Sembower, Inc., Box 1138, Reading, Pa.

Pusey and Jones Calculator

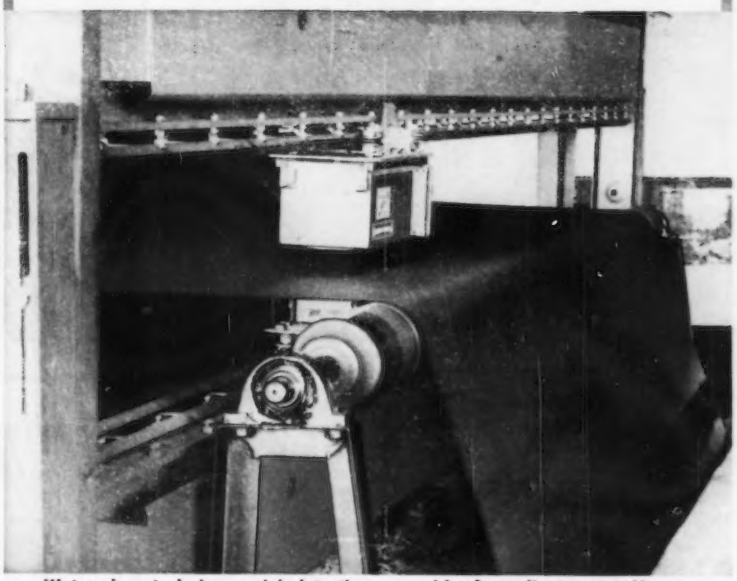
Figures paper production and dryer calculations in pounds per hour and tons per day for 12 different ream counts and dryer requirements of steam pressure vs the number of dryers for eight types of paper and five different dryer sizes. Value $5.00. Limited number available free to those giving company name and title. Pusey & Jones Corp., Wilmington 99, Del.

Toledo Automatic Batching Systems

Describes the latest product developments in the field of batching control. Emphasis is given both to remote setting of formulas and remote recording of digital data for complete batch control and recording. Brochure 2964. Toledo Scale, Div. of Toledo Scale Corp., Toledo 12, Ohio.

PRODUCTION UP, "BROKE" REDUCED AT THE **UPSON** COMPANY WITH

CURTISS-WRIGHT BASIS WEIGHT CONTROL SYSTEM



Wet end control gives quick detection—provides fast adjustment at Upson.

Like many other mills, the Upson Company of Lockport, N. Y. has solved the problem of maintaining uniformity in paper production without wasteful broke and production time losses by installing the Curtiss-Wright Basis Weight Control System.

The non-contacting measuring head at the wet end traverses the width of the sheet and continuously records basis weight. Variations from pre-set tolerances are instantly signalled to the automatic controller which triggers corrective action at the stock gate.

Result: Greater uniformity, increased saleable tonnage, improved drying efficiency, time saved in weight and order changes, chest run-outs and start-ups.

Find out how Curtiss-Wright Basis Weight Control Systems can improve your production with new economy. Write Industrial Controls Department, Electronics Division, Curtiss-Wright Corporation, Carlstadt, New Jersey.

Systems Frieseke & Hoepfner

Industrial Controls Department,

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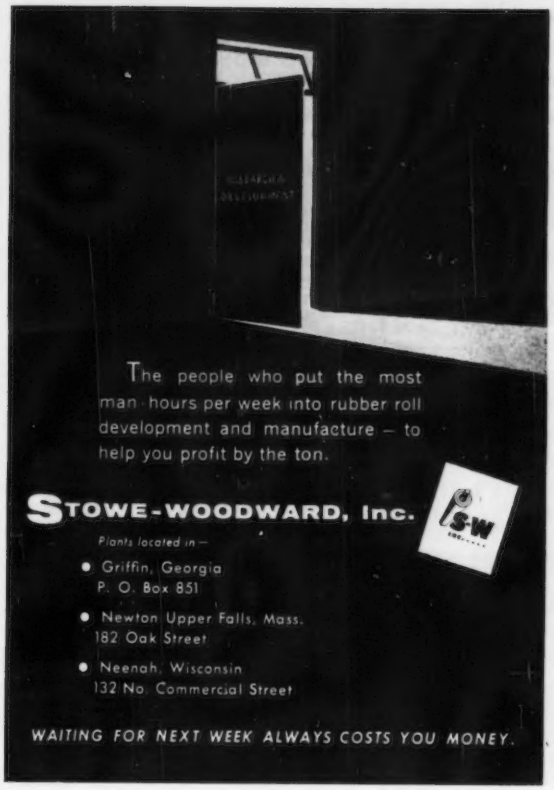

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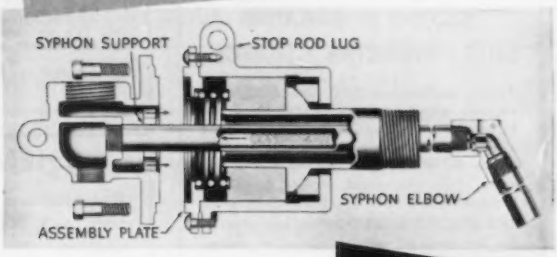
. . . PRINTING PRESSES



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Your inquiry with full resume will receive immediate and confidential attention. Write Manager, Industrial Service Department, The Northwest Paper Company, Cloquet, Minnesota. J-26

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3-5 years' experience in bleached kraft and/or specialty paper mill for an Ontario integrated bleach kraft pulp and paper mill. Involves work in mill control and/or process control and development. Please furnish complete particulars as to age, experience, marital status, references, salary to: Box 59-3, care Paper Trade Journal. J-19

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1— 86" Lobdell 5 roll.
1— 86" P & J 7 roll
2—115" B-C 7 roll.
1—124" B-C 5 roll
1—124" B-C 6 roll
1—128" Downingtown 7 roll

CHIPPERS
1—96" Murray 6 knife; A-F Brng.

CONVERTING MACHINERY
1—2 ft. x 3 ft. Seybold Die Press
4—30" Thermo Pressure Sealing Machines
1—36" Printed Web Gillis Dryer
1—42" Knowlton Core Cutter
1—60" Knowlton Tube Roller
1—72" Hudson Sharp Laminator

CYLINDER MOLDS
2— 63" face x 36" dia w/rubber couches
1— 72" face x 48" dia
1— 73" face x 48" dia
1— 92" face x 30" dia
1—102" face x 36" dia
2—104" face x 36" dia
1—107" face x 48" dia; A-F Brng
2—111" face x 36" dia; A-F Brng
1—132" face x 36" dia; A-F Brng
1—132" face x 42" dia; A-F Brng
1—136" face x 54" dia; SS covering

DRYERS—HYDROSTATICALLY TESTED
16" Dia.: 2—46" face w/Accessories.
18" Dia.: 1—90" face w/A-F Brng.
24" Dia.: 38—46" face; Chrome plated
28" Dia.:
3—70" face w/gears & bearings
3—73" face w/gears & bearings.
3—76" face w/gears & bearings.
3—77" face w/gears & bearings.
2—84" face.
2—160" face w/rope carriers.
36" Dia.:
1—42" face.
2—44" face.
2—46" face.
4—70" face w/gears & bearings.
11—72" face w/gears & bearings.
1—74" face Lukenweld w/A-F Brng.
1—74" face w/gears & bearings.
3—75" face w/gears & bearings.
9—76" face w/gears & bearings.
1—77" face w/gears & bearings.
1—78" face w/gears & bearings.
2—80" face.
5—84" face.
1—92" face.
1—138" face.
10—160" face.
42" Dia.:
20—78" face; complete section
1—106" face
1—110" face.
1—120" face.
1—160" face.
48" Dia.:
58—46" face; chrome plated.
1—52" face w/gears & bearings.
1—82" face w/gears & bearings.
5—90" face w/gears & bearings.
4—94" face
10—100" face w/bearings.
25—110" face w/frames & bearings.
12—123" face w/gears, frames & bearings.
1—128" face.
1—130" face.
14—160" face.

CYLINDER WET ENDS
1— 99" face x 48" dia Downingtown single cylinder; 18" dia couch
1—132" face x 36" dia Beloit seven cylinder; 18" dia couches & four sets of presses

DRIVES
Various 2 hp thru 150 hp; all types.

EMBOSSERS
1—80" Hudson Sharp; A-F Brng
3—62" Textile Machinery Co.; complete

EXTRACTOR ROLL
1—134" face x 24" dia Downingtown w/18" dia rubber couch

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1—10' face x 8' dia Dorr-Oliver continuous

FLAT SCREENS
1—10 Plate IMPCO w/dunbar drive & bronze vat
2—12 Plate IMPCO w/braemer controls
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1—Jones #4 Imperial w/A-F Brng & SS filling
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1—#1 Dilts Hydrafiner w/motor & S.S. filling
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1—208" x 32" Farrel w/crowning device.

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1—80" B-C heavy duty board model
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1—157" Masson-Scott; like new

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1—124" Cameron quick change slitter assembly

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1— 60" Kidder Model SH; 40" dia rewind
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1—110" Cameron Model 18; 60" dia rewind
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1—136" Langston Type DA; A.F. Brng; 60" dia. rewind
1—148" Langston shear cut; A-F Brng; 60" dia rewind
1—194" Cameron Model 19; A-F Brng

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1—122" drilled face x 18" dia Sandusky
1—122" drilled face x 25" dia Sandusky
1—135" drilled face x 22" dia Sandusky
1—192" drilled face x 30" dia Millspaugh

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1— 90" drilled face x 18" dia Sandusky
1— 98" drilled face x 18" dia Sandusky
1—166" drilled face x 19" dia Millspaugh; used 2 mos; A.-F. Brng; rubber covered.
1—194" drilled face x 30" dia Millspaugh

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2—30" Norwood 4 roll
1—63" Norwood 8 roll; A-F Brng.
1—65" Norwood 8 roll; A-F Brng.
1—92" Norwood 7 roll w/drive

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1— 92" face x 36" dia cyl w/rubber couch; less vat
6—132" face x 36" dia cyl w/16" dia rubber couches; A-F Brng
1—132" face x 42" dia cyl w/16" dia rubber couch; A-F Brng

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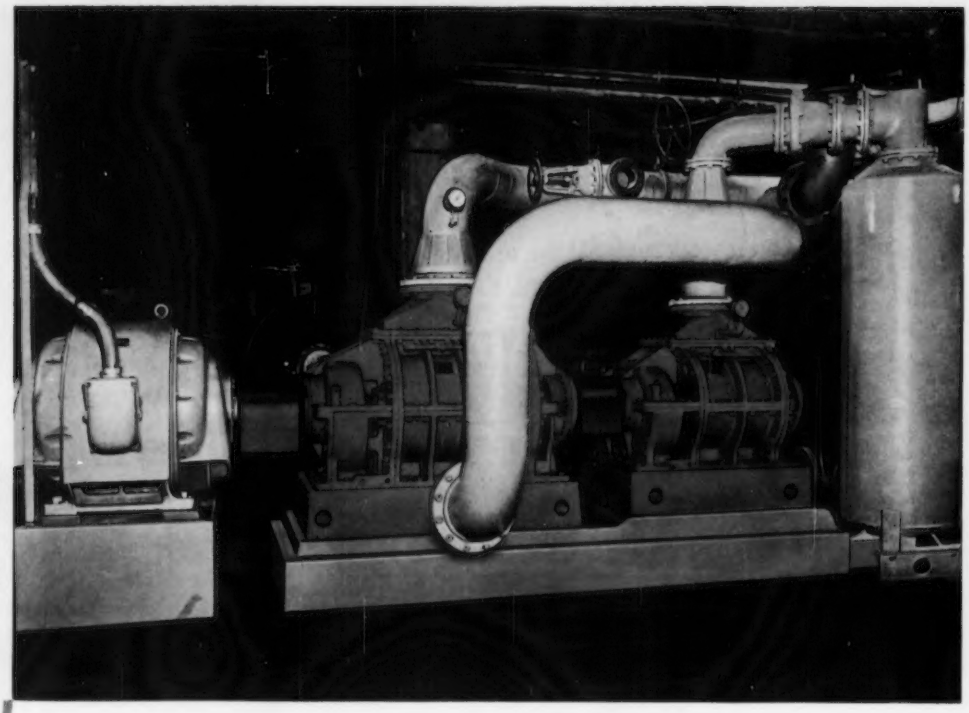

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